

Disclaimer: Information contained in the report addresses environmental conditions only and is not the official South Florida Water Management District operations recommendation or decision.

## **M E M O R A N D U M**

**TO:** John Mitnik, Assistant Executive Director, Executive Office Staff

**FROM:** SFWMD Staff Environmental Advisory Team

**DATE:** July 13, 2022

**SUBJECT:** Weekly Environmental Conditions for Systems Operations

### **Summary**

#### **Weather Conditions and Forecast**

A pocket of high moisture currently over the western Bahamas will move westward into the SFWMD Wednesday, causing heavy rains over the southwest coast. By mid-to-late week, a tropical cyclone could form over the northern Gulf of Mexico. Regardless of any development of this feature, most of the rains on Thursday will be found over the western portions of the SFWMD. Meanwhile, an upper-level low currently north of Puerto Rico will move towards the Florida Straits on Saturday, but the exact timing is highly uncertain. The upper-level low could favor heavy rainfall across the SFWMD on Saturday and remain in place until early next week. The total average SFWMD rainfall ending next Tuesday morning will likely be slightly above normal but could be much above normal.

#### **Kissimmee**

Flow at S-59 and S-61 is being adjusted to allow stage to rise gradually in East Toho and Toho, respectively. Flow at S-65/S-65A was reduced to 0 cfs to slow the stage decline in KCH, although some releases were made from S-65A to control the rainfall-driven stage rise in Pool A. Water depth on the Kissimmee River floodplain declined over the week, with a mean depth of 0.29 feet on July 10, 2022. The concentration of dissolved oxygen in the Kissimmee River decreased slightly, with an average of 4.2 mg/L for the week ending on July 10, 2022.

#### **Lake Okeechobee**

Lake Okeechobee stage was 12.93 feet NGVD on July 10, 2022, with water levels 0.07 feet higher than a month ago (**Figure LO-1**). Lake stage on July 10, 2022 was in the Base Flow sub-band (**Figure LO-2**) and 0.01 feet above the ecological envelope (**Figure LO-3**). Stages briefly entered the ecological envelope last week after spending four weeks above. Average daily inflows (excluding rainfall) decreased from the previous week, going from 1,060 cfs to 743 cfs. Average daily outflows (excluding evapotranspiration)

decreased, going from 71 cfs to 63 cfs. The most recent satellite image (July 10, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed that bloom potential was moderate in the nearshore areas of the lake and at the offshore areas in the northern part of the lake. The bloom potential decreased compared to the previous week. The July 6-7 routine phytoplankton monitoring survey on the lake revealed that 28% of the sites had total microcystins concentration above the detection limit, but all values were below the EPA recreational standard of 8 µg/L. The highest toxin concentration (3.5 µg/L) was recorded at the RITTAE2 location in the southern part of the Lake. Communities at 31% of the sites were dominated by *Microcystis aeruginosa* while 56% of the sites had mixed communities.

## **Estuaries**

Total inflow to the St. Lucie Estuary averaged 714 cfs over the past week with no flow coming from Lake Okeechobee. Mean salinities decreased at all three sites over the past week. Salinity in the middle estuary was within the optimal range (10-25) for adult eastern oysters.

Total inflow to the Caloosahatchee Estuary averaged 3,044 cfs over the past week with 0 cfs coming from the Lake. Mean surface salinities remained the same at S-79, Val I-75, and Ft. Myers and decreased slightly at the remaining sites within the estuary over the past week. The seven-day mean salinity values were within the optimal range for adult eastern oysters at Shell Point, in the stressed range at Sanibel, and in the damaging range at Cape Coral.

## **Stormwater Treatment Areas**

For the week ending Sunday, July 10, 2022, no Lake Okeechobee water was delivered to the FEBs/STAs. The total amount of Lake releases sent to the FEBs/STAs in WY2023 (since May 1, 2022) is approximately 12,400 ac-feet. The total amount of inflows to the STAs in WY2023 is approximately 346,000 ac-feet. Most STA cells are near or above target stage. STA-1E Western Flow-way is offline for post-construction vegetation grow in. Additionally, STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown, STA-2 Flow-way 2 is offline for construction activities, and STA-5/6 Flow-way 4 is offline for vegetation management activities. Operational restrictions are in effect in STA-1E Central and Eastern Flow-ways, STA-1W Eastern, Western, and Northern Flow-ways, and STA-2 Flow-ways 3 and 4 for vegetation management activities. This week, there is no capacity for Lake releases in the STAs.

## **Everglades**

Ascension rates fell in the "good" or "fair" categories with WCA-2A remaining in the "poor" category as recession rates remain high in that basin which has the potential to negatively impact flora and fauna. A wildfire has been recently reported in WCA-3A North. Taylor

slough stages remain stable falling slightly over the last week. Salinities continued to decrease in Florida Bay, and overall the bay remains below average for this time of year.

### **Biscayne Bay**

Mean total inflow to Biscayne Bay was 303 cfs and the previous 30-day mean inflow was 971 cfs. The seven-day mean salinity was 18.9 at BBCW8 and 26.5 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Salinity data provided as a courtesy by Biscayne National Park.

## Supporting Information

### Kissimmee Basin

#### *Upper Kissimmee*

On July 10, 2022, lake stages were 55.0 feet NGVD (1.5 feet below schedule) in East Lake Toho, 52.3 feet NGVD (1.2 feet below schedule) in Lake Toho, and 48.8 feet NGVD (2.2 feet below schedule) in Lakes Kissimmee-Cypress-Hatchineha (KCH) (**Table KB-1, Figures KB-1-3**).

#### *Lower Kissimmee*

Discharges to the Kissimmee River were reduced to 0 cfs at S-65 and S-65A on Wednesday June 22, 2022 to slow the rate of stage decline in KCH. Discharges on July 10, 2022 were 0 cfs at S-65 and 120 cfs at S-65A; the discharge at S-65A was to control the rise in S-65A headwater stage. Discharges from the Kissimmee River were 270 cfs at S-65D and 240 cfs at S-65E (**Table KB-2**). Headwater stages were 46.2 feet NGVD at S-65A and 26.2 feet NGVD at S-65D on July 10, 2022. The concentration of dissolved oxygen in the Kissimmee River declined slightly over the last week to a low of 3.9 mg/L on July 10, 2022, with an average of 4.2 mg/L for the week ending on July 10, 2022 (**Table KB-2, Figure KB-5**). Over the week ending July 10, 2022, Kissimmee River mean river channel stage varied with S-65A discharge (**Figure KB-4**); water depth on the Kissimmee River floodplain declined over the week, with a mean depth of 0.29 feet on July 10, 2022 (**Figure KB-6**).

#### *Water Management Recommendations*

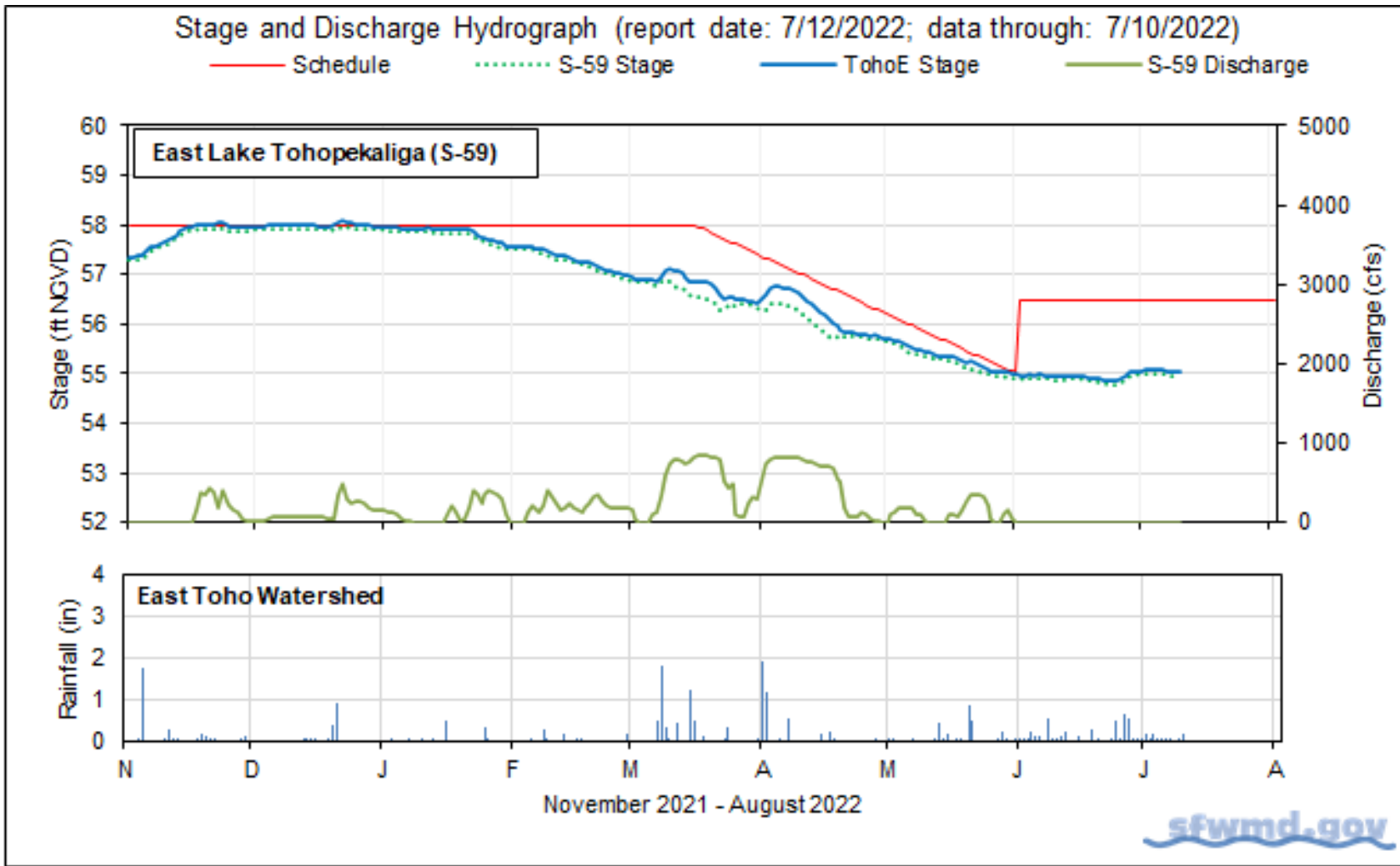
When possible, limit stage ascension rates in Lakes East Toho, Toho and KCH to a preferred maximum of 0.5 ft/14 days. Encourage stage in KCH to rise gradually by continuing 0 cfs discharge at S-65 and S-65A except when S-65A flow can be increased to manage stage in Pool A.

**Table KB-1.** Average discharge for the preceding seven days and Sunday's average daily stage and departures from KCL flood regulation or temporary schedules. All data are provisional.

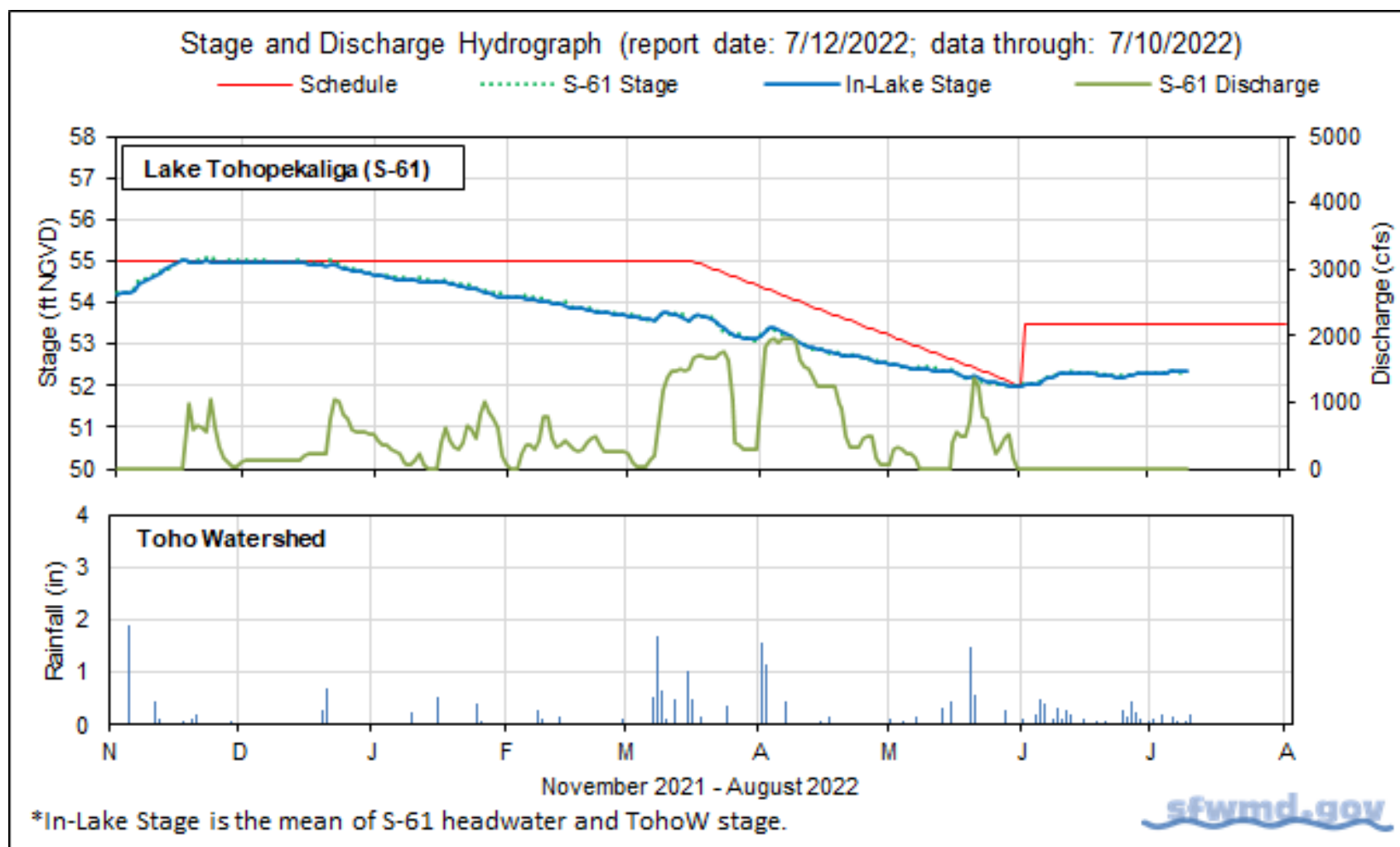
Water Body	Structure	Stage Monitoring Site	7-Day Average Discharge (cfs)	Lake Stage (feet NGVD) <sup>a</sup>	Schedule Type <sup>b</sup>	Schedule Stage (feet NGVD)	Departure from Regulation (feet)	
							7/10/22	7/3/22
Lakes Hart and Mary Jane	S-62	LKMJ	0	59.5	R	60.0	-0.5	-0.5
Lakes Myrtle, Preston and Joel	S-57	S-57	0	60.1	R	61.0	-0.9	-0.9
Alligator Chain	S-60	ALLI	0	62.2	R	63.2	-1.0	-1.1
Lake Gentry	S-63	LKGT	0	59.7	R	61.0	-1.3	-1.4
East Lake Toho	S-59	TOHOE	0	55.0	R	56.5	-1.5	-1.4
Lake Toho	S-61	TOHOW S-61	0	52.3	R	53.5	-1.2	-1.2
Lakes Kissimmee, Cypress and Hatchineha	S-65	KUB011 LKIS5B	0	48.8	R	51.0	-2.2	-2.3

a. Names of in-lake monitoring sites and structures used to determine lake stage. If more than one site is listed, an average is reported.

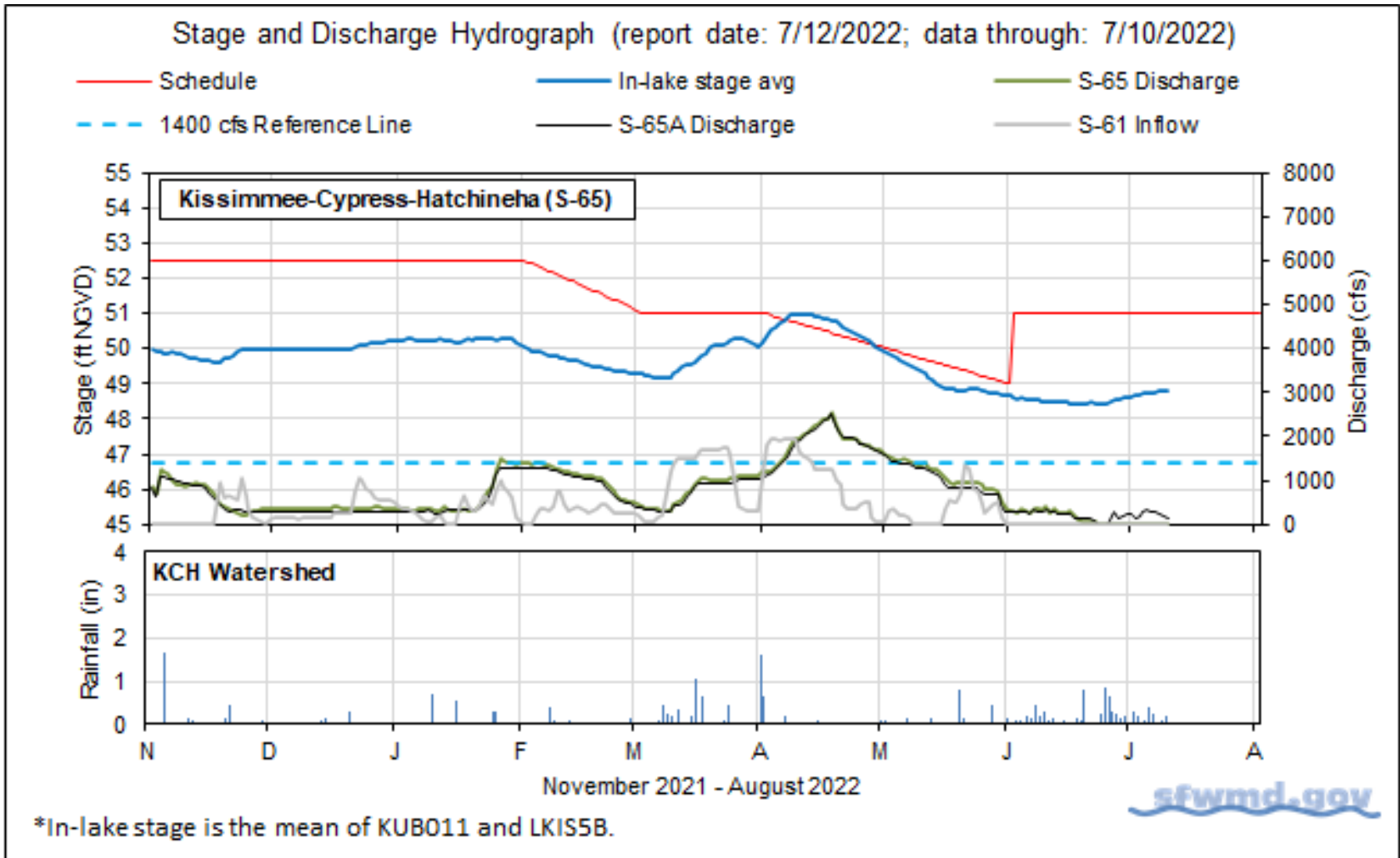
b. A: projected recession line; R: USACE regulation schedule; S: temporary recession target line; T: temporary schedule; NA: not applicable or not available.



**Figure KB-1.** East Lake Toho regulation schedule, stage, discharge and rainfall.



**Figure KB-2.** Lake Toho regulation schedule, stage, discharge and rainfall.



**Figure KB-3.** Lakes Kissimmee, Cypress and Hatchineha regulation schedule, stage, discharge and rainfall.



**Table KB-2.** One- and seven-day average discharge and stage at Lower Kissimmee basin structures, river channel dissolved oxygen concentrations and water depths in the Phase I area floodplain. All data are provisional.

Metric	Location	Daily Average	Average for Previous Seven Day Periods			
		7/10/22	7/10/22	7/3/22	6/26/22	6/19/22
Discharge	S-65	0	0	0	30	210
Discharge	S-65A <sup>a</sup>	120	250	200	70	190
Headwater Stage (feet NGVD)	S-65A	46.2	46.5	46.5	46.5	46.4
Discharge	S-65D <sup>b</sup>	270	340	470	310	310
Headwater Stage (feet NGVD)	S-65D <sup>c</sup>	26.2	26.2	26.2	26.2	26.6
Discharge (cfs)	S-65E <sup>d</sup>	240	270	380	230	300
Discharge (cfs)	S-67	0	0	0	0	0
Dissolved Oxygen (mg/L) <sup>e</sup>	Phase I, II/III river channel	3.9	4.2	4.4	5.5	7.4
Mean depth (feet) <sup>f</sup>	Phase I floodplain	0.29	0.32	0.40	0.41	0.28

a. Combined discharge from main and auxiliary structures.

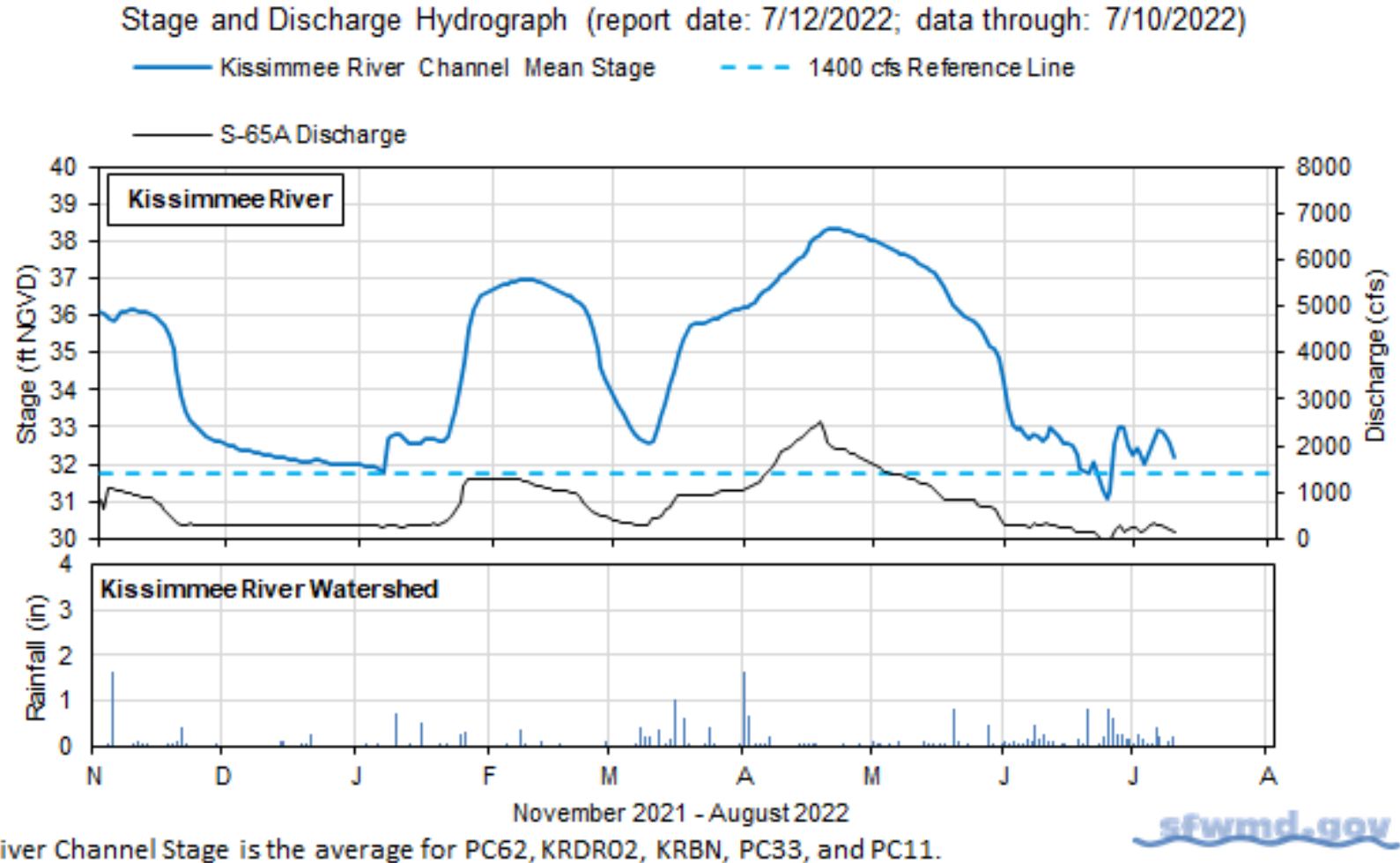
b. Combined discharge from S-65D, S-65DX1 and S-65DX2.

c. Average stage from S-65D and S-65DX1.

d. Combined discharge from S-65E and S-65EX1.

e. Dissolved oxygen is the average of values from sondes KRBN, PC62, PC33, PD62R and PD42R.

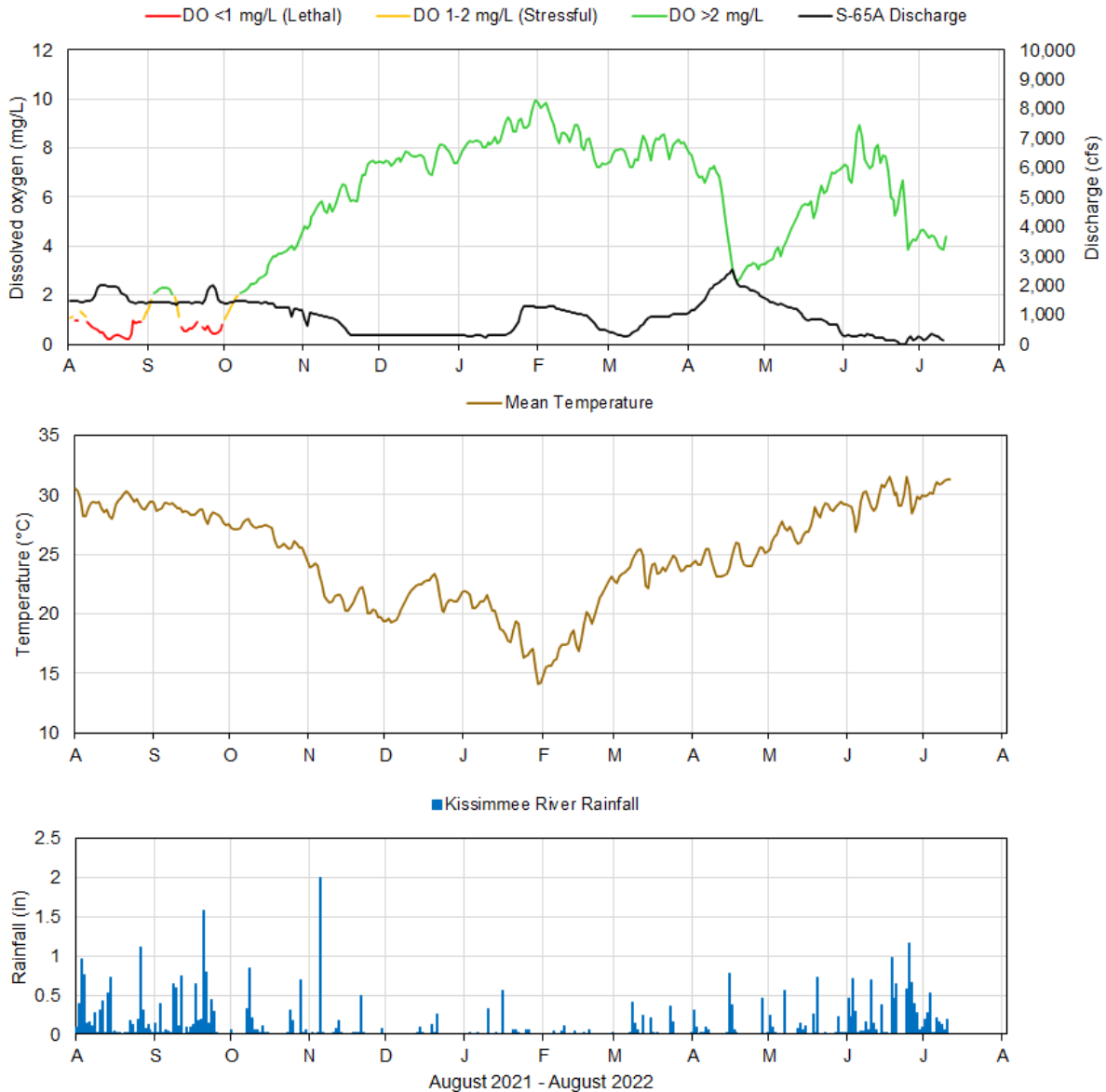
f. One-day spatial average obtained from the South Florida Water Depth Assessment Tool (SFWDAT).



**Figure KB-4.** Kissimmee River stage, discharge and rainfall.

**Table KB-3.** Discharge rate of change limits for S65/S-65A (revised 1/14/19).

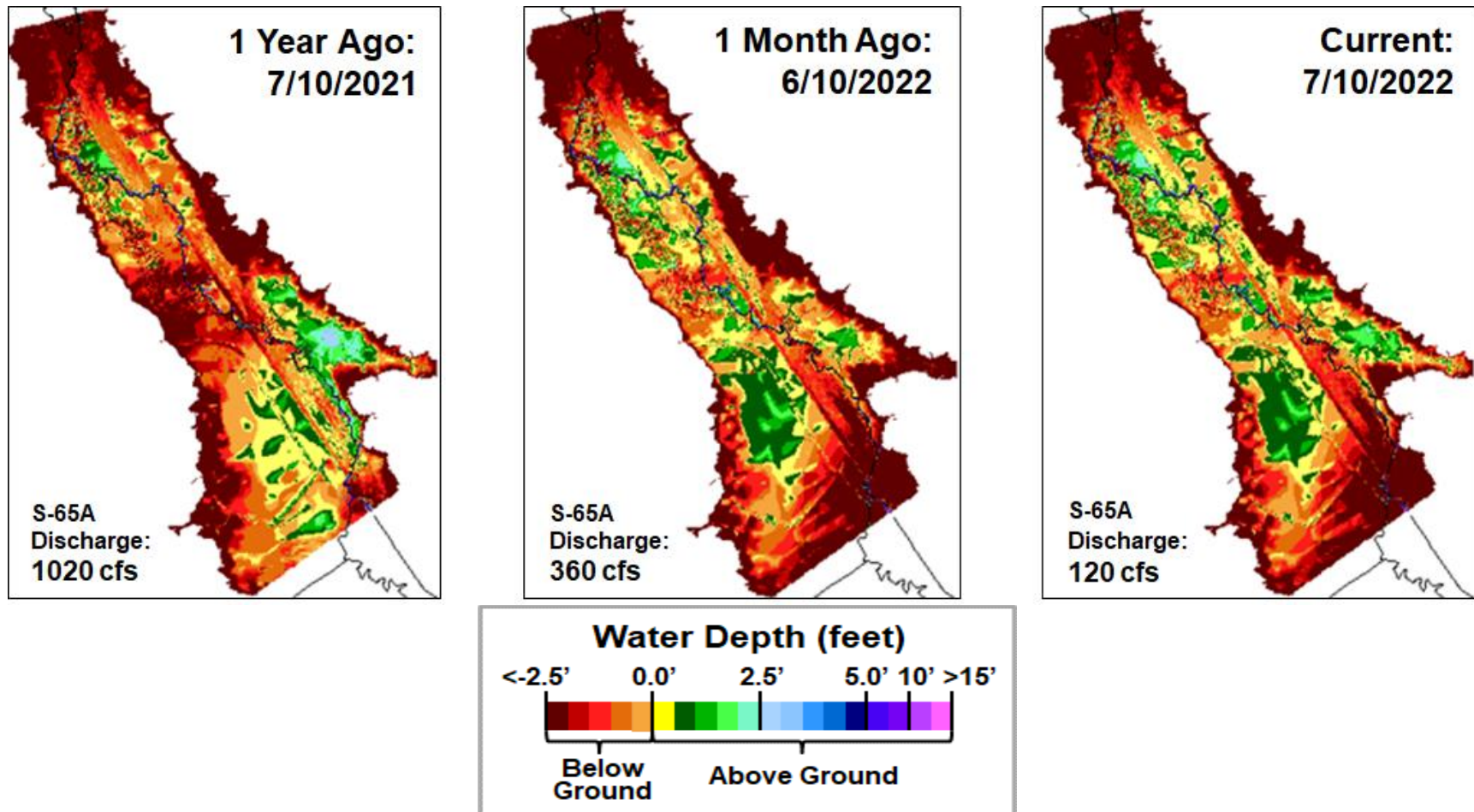
Discharge (cfs)	Maximum Rate of Increase (cfs/day)	Maximum Rate of Decrease (cfs/day)
0-300	100	-50
301-650	150	-75
651-1,400	300	-150
1,401-3,000	600	-600
>3,000	1,000	-2,000



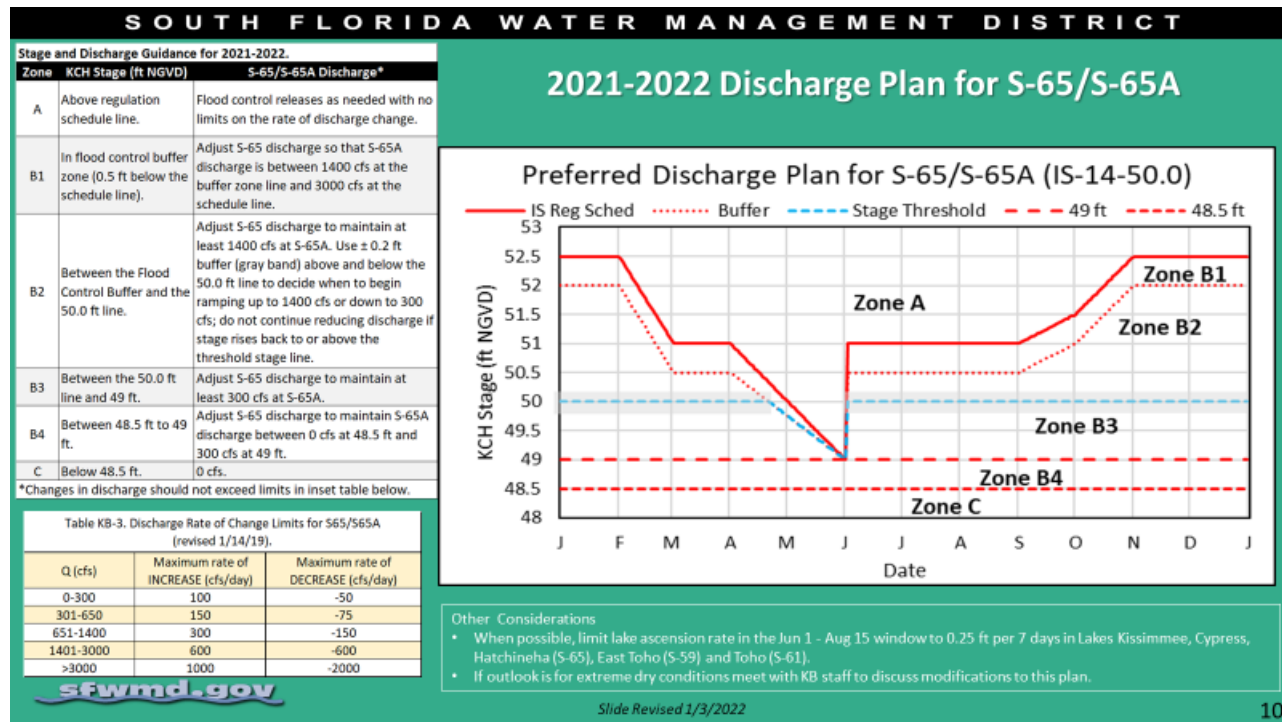
Report Date: 7/12/2022; data are through: 7/10/2022

[sfwmd.gov](http://sfwmd.gov)

**Figure KB-5.** Restored Kissimmee river channel mean daily dissolved oxygen concentration (mg/L), S-65A discharge (cfs), temperature (°C) and rainfall (inches). Dissolved oxygen (DO) and temperature are mean daily values averaged for PC62, KRDR02, KRBN, PC33, PC11, PD62R, and PD42R with an average of three stations reporting this week. Rainfall values are daily totals for Kissimmee River (Pool BCD) AHED watershed.



**Figure KB-6.** Phase I area Kissimmee River floodplain water depths (from left to right) one year ago, one month ago and current.



**Figure KB-7.** IS-14-50 Discharge Plan for S65/S65A with discharge rate of change limits (revised 1/14/19).

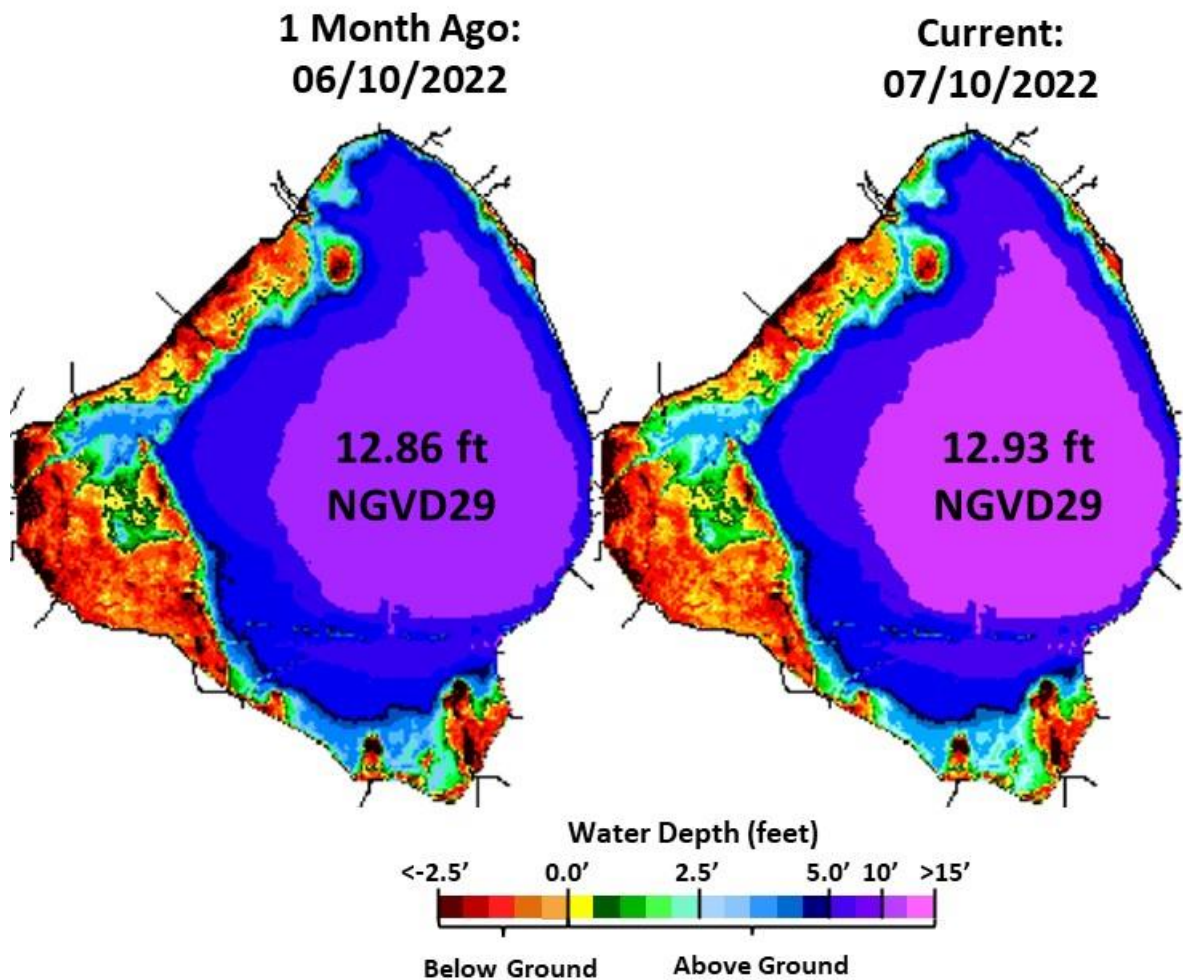
## Lake Okeechobee

Lake Okeechobee stage was 12.93 feet NGVD on July 10, 2022, with water levels 0.07 feet higher than a month ago (**Figure LO-1**). Lake stage was in the Base Flow sub-band (**Figure LO-2**) and briefly entered the ecological envelope last week before finishing 0.01 feet above (**Figure LO-3**). Lake stage rose above the ecological envelope on June 8, 2022, after spending 22 weeks within it. According to NEXRAD, 1.95 inches of rain fell directly on the Lake last week.

Average daily inflows (excluding rainfall) decreased from the previous week, going from 1,060 cfs to 743 cfs. Average daily outflows (excluding evapotranspiration) decreased, going from 71 cfs to 63 cfs. Highest inflow came from the Kissimmee River/C-38 Canal through the S-65E structure (271 cfs). Backflow into the Lake via the S-308 structure averaged 224 cfs. The only outflow occurred via the S-271 structure at an average rate of 63 cfs. There was no outflow to the west via the S-77 structure or to the south via the S-350 structures. **Figures LO-4 and LO-5** show the combined average daily inflows and outflows for the Lake over the past eight weeks, and average inflows and outflows last week, respectively. These data are provisional and are subject to change.

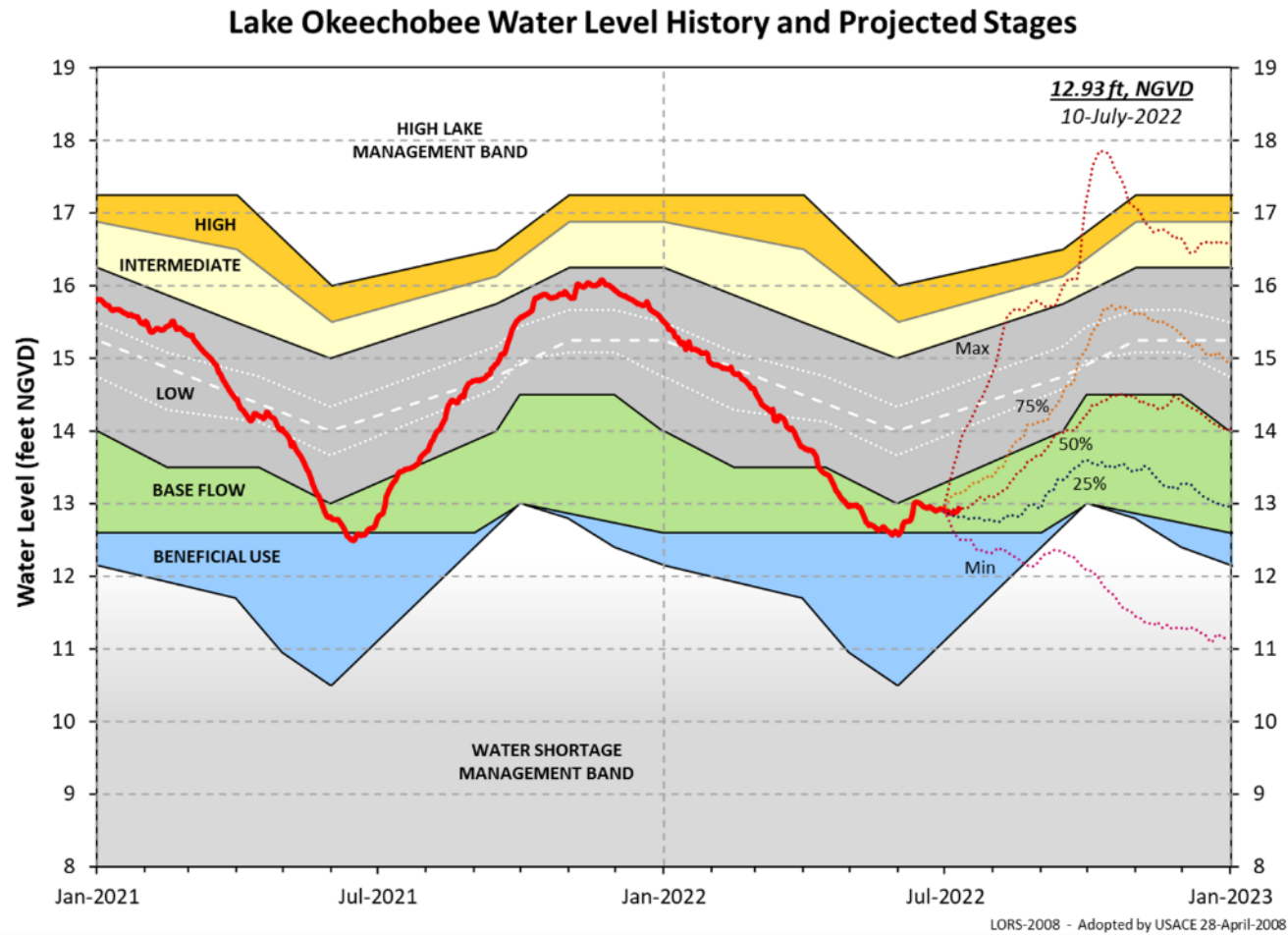
The most recent satellite image (July 10, 2022) from NOAA's Harmful Algal Bloom Monitoring System showed that bloom potential was moderate in the nearshore areas of the Lake and at the offshore areas in northern part of the Lake. The bloom potential decreased compared to the previous week (**Figure LO-6**). The July 6-7 routine phytoplankton monitoring survey revealed that 28% of the sites had total microcystins concentration above the detection limit, but all values were below the EPA recreational standard of 8 µg/L. The highest toxin concentration (3.5 µg/L) was recorded at the RITTAE2 location in the southern part of the Lake. Communities at 31% of the sites were dominated by *Microcystis aeruginosa* while 56% of the sites had mixed communities.

## Changes in Water Depth



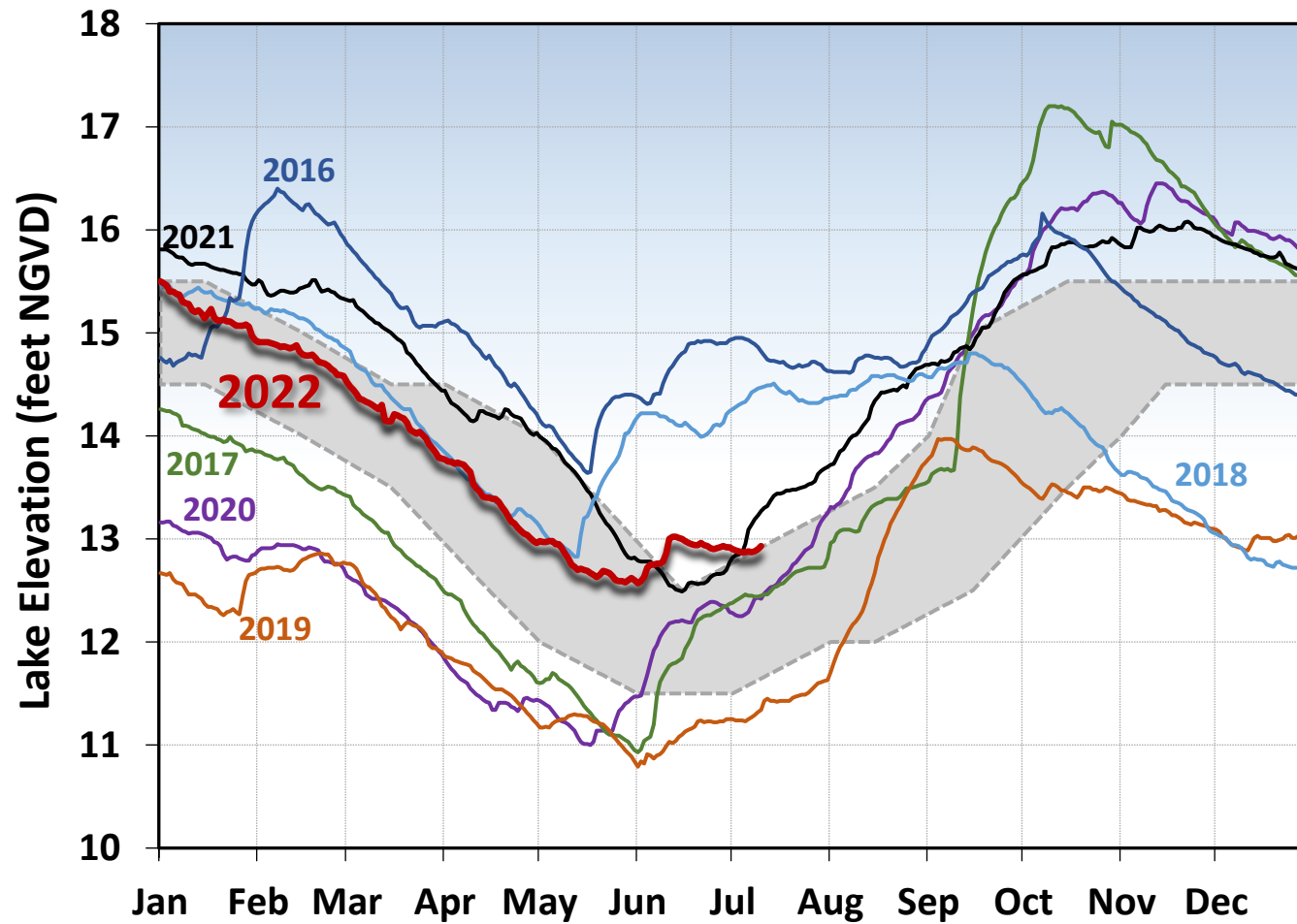
**Figure LO-1.** Lake Okeechobee water depth estimates based on South Florida Water Depth Assessment Tool (SFWDAT).



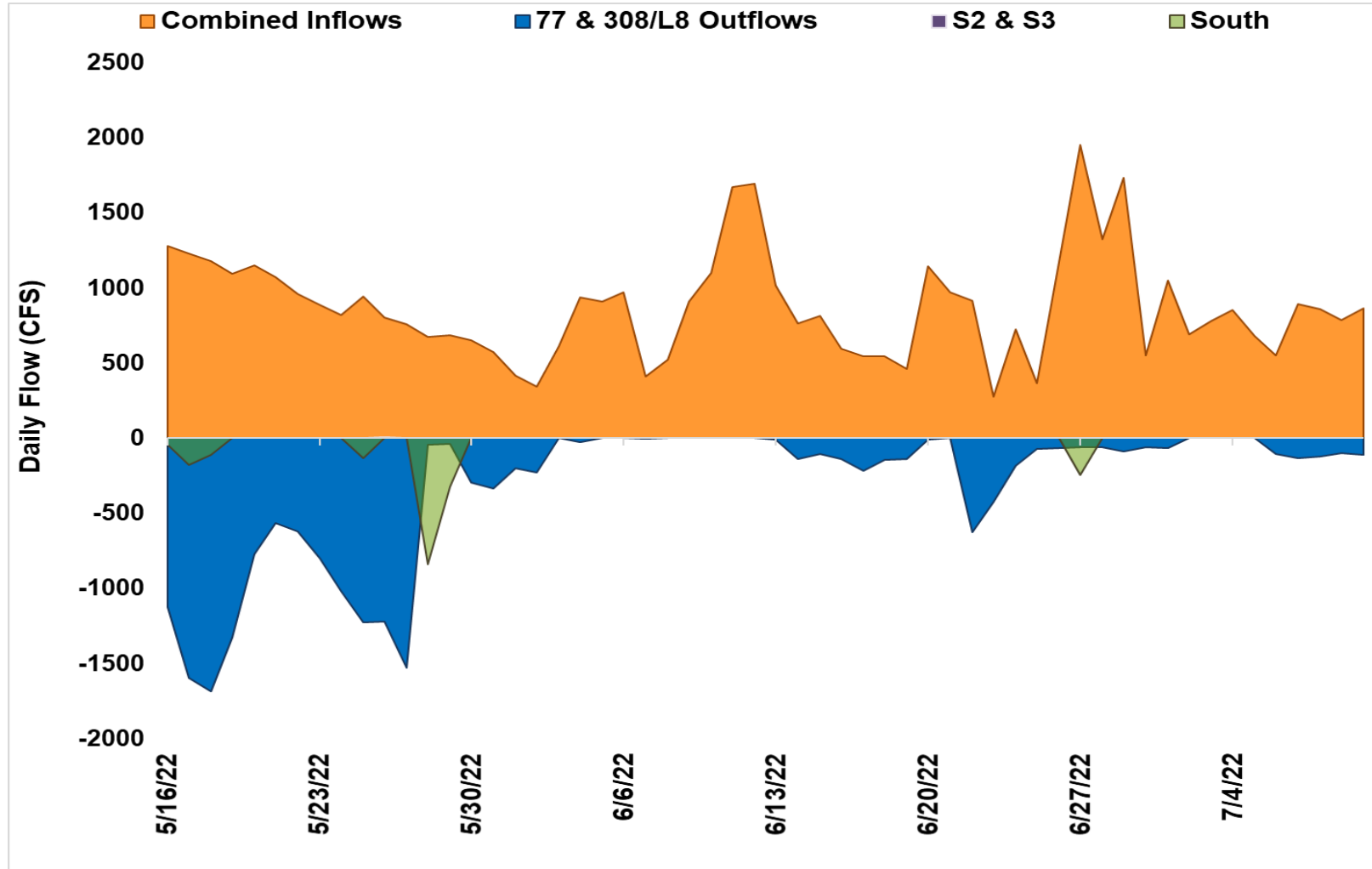


**Figure LO-2.** Recent Lake Okeechobee stages with projected stages based on a dynamic position analysis.

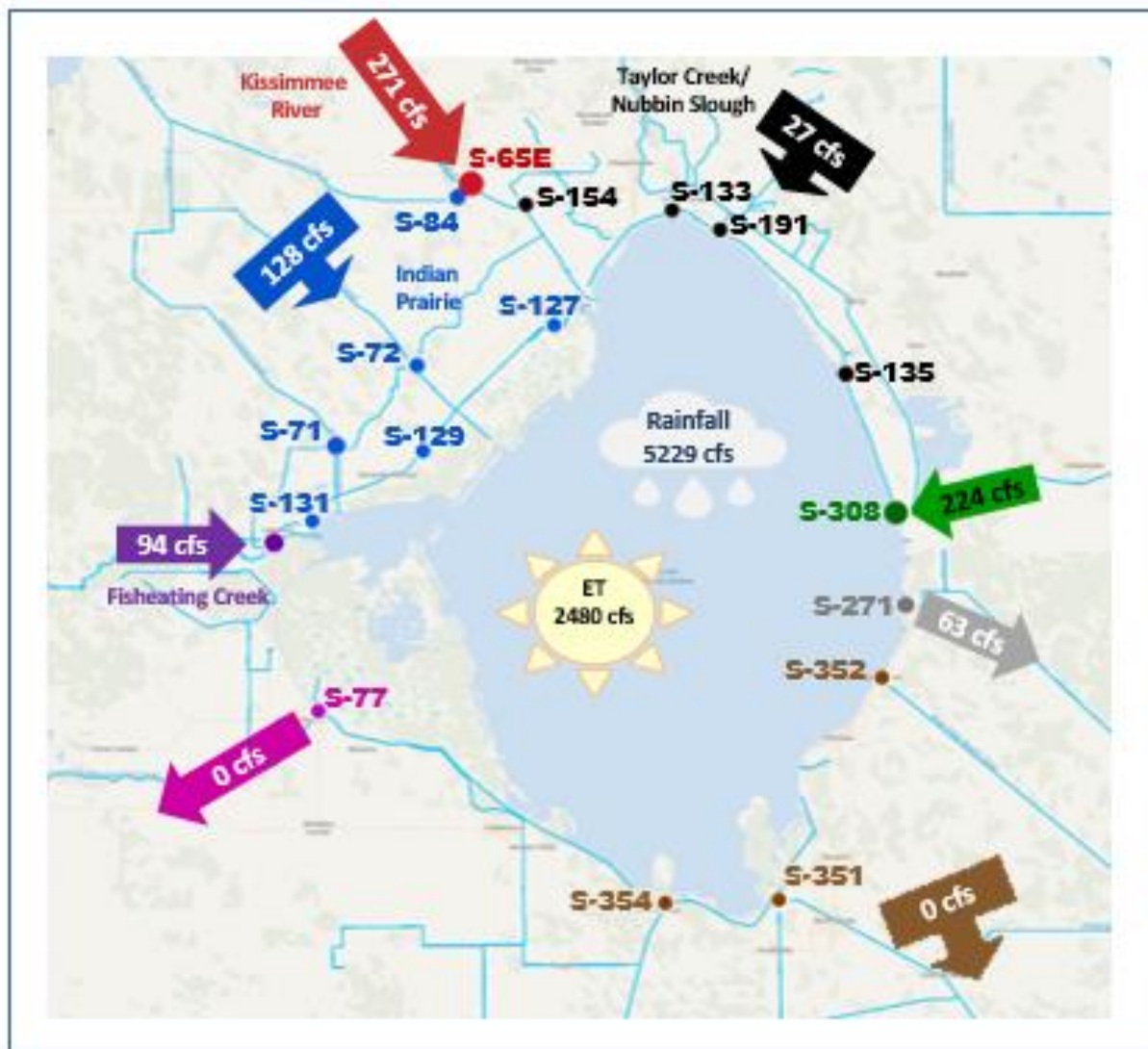
## Lake Okeechobee Stage vs Ecological Envelope



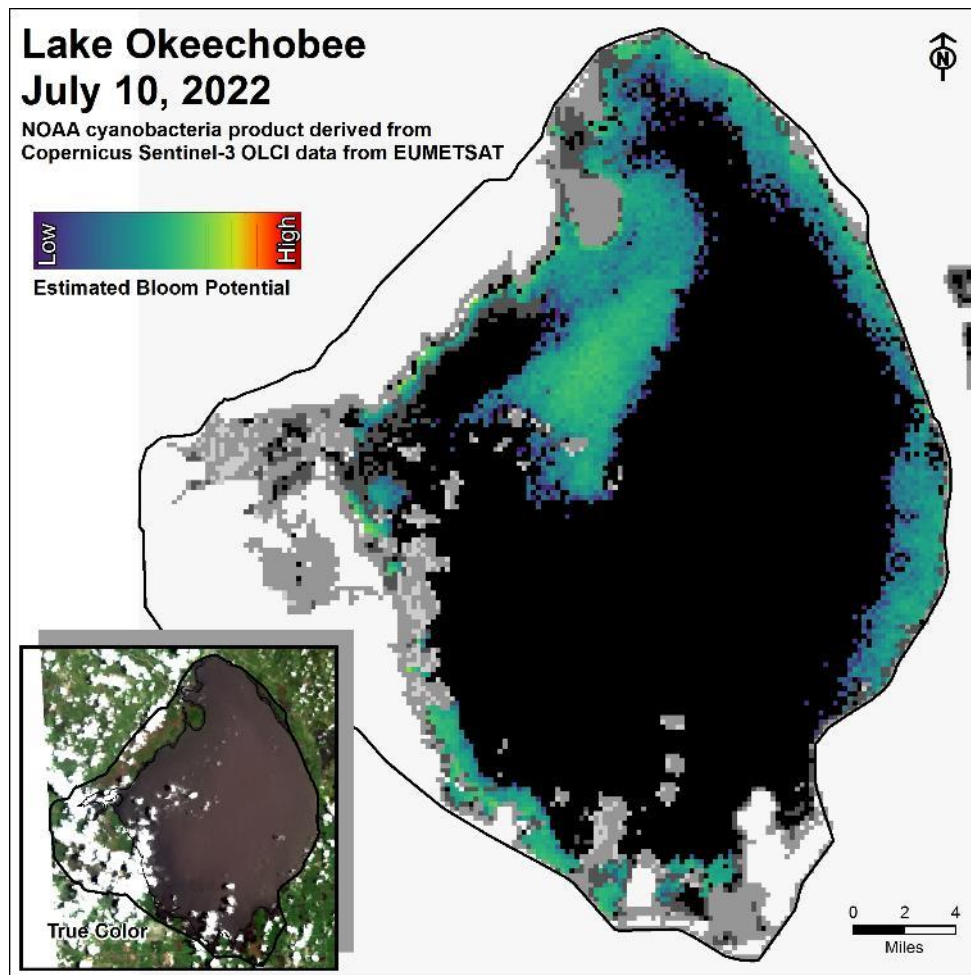
**Figure LO-3.** The prior six years of annual stage hydrographs for Lake Okeechobee in comparison to the ecological envelope.



**Figure LO-4.** Major inflows (orange) to and outflows east and west (blue) from Lake Okeechobee. Outflows south are shown in green. Flows into Lake Okeechobee from the L-8 canal through S-271 (formerly Culvert 10A) or from the C-44 canal through the S-308 are included as inflows. Conversely, flows from Lake Okeechobee into the L-8 or C-44 canals are included with outflows. Inflows are shown as positive values; outflows are negative. Outflows through the S-77 (Caloosahatchee) and S-308 (C-44 Canal) structures are based on downstream gauges to include flows to lock openings for navigation.



**Figure LO-5.** Inflows into Lake Okeechobee from Indian Prairie basins, Taylor Creek/Nubbin Slough, Kissimmee River and Fisheating Creek, and outflows to the west via S-77, to the east via S-308, to the south via S-351, S-352, S-354, and to southeast via S-271 (formerly Culvert 10A) for the week of July 4 - 10, 2022.



**Figure LO-6.** Cyanobacteria bloom potential on July 10, 2022 based on NOAA's harmful algal bloom monitoring system. Gray color indicates cloud cover.

## Estuaries

### *St. Lucie Estuary*

Over the past week, mean total inflow to the St. Lucie Estuary was 714 cfs (**Figures ES-1 and ES-2**) and the previous 30-day mean inflow was 767 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-2**.

Over the past week, salinities decreased at all sites in the estuary (**Table ES-1 and Figure ES-3**). The seven-day moving average of the surface and bottom salinities at the US1 Bridge was 16.1. Salinity conditions in the middle estuary were estimated to be within the optimal range for adult eastern oysters (**Figure ES-4**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute was 15.3 spat/shell for June and was higher than any recruitment rate reported in the past two years (**Figure ES-5**). Oyster density for the month of June was reported as 427 live oysters/m<sup>2</sup> at the Rio monitoring station.

### *Caloosahatchee River Estuary*

Over the past week, mean total inflow to the Caloosahatchee River Estuary was 3,044 cfs (**Figures ES-6 and ES-7**) and the previous 30-day mean inflow was 3,605 cfs. For comparison, the historical provisional mean inflows from the contributing areas are shown in **Figure ES-7**.

Over the past week, surface salinities remained the same at S-79, Val I-75, and Ft. Myers and decreased slightly at Cape Coral, Shell Point, and Sanibel (**Table ES-2 and Figures ES-8 and ES-9**). The seven-day mean salinities (**Table ES-2**) were in the optimal range (0-10) for tape grass in the upper estuary. The seven-day mean salinity values were within the optimal range for adult eastern oysters at Shell Point, in the stressed range at Sanibel, and in the damaging range at Cape Coral (**Figure ES-10**). The mean larval oyster recruitment rate reported by the Fish and Wildlife Research Institute for June was 6.5 spat/shell at Iona Cove and 3.0 at Bird Island (**Figures ES-11 and ES-12**). Oyster density was 98 live oysters/m<sup>2</sup> at Iona Cove and 686 live oysters/m<sup>2</sup> at Bird Island for June.

Surface salinity at Val I-75 was forecasted for the next two weeks, using an autoregression model (Qiu and Wan, 2013<sup>1</sup>) coupled with a linear reservoir model for the tidal basin. Model scenarios included pulse releases at S-79 ranging from 0 to 1500 cfs, and steady releases at 2,000 cfs with estimated tidal basin inflows of 1037 cfs. Model results from all scenarios predict daily salinity to be 1.2 or lower and the 30-day moving average surface salinity to be 0.4 or lower at Val I-75 at the end of the two-week period (**Table ES-3 and Figure ES-13**). This keeps predicted salinities in the upper estuary within the optimal salinity range (0-10) for tape grass.

---

<sup>1</sup> Qui, C., and Y. Wan. 2013. Time series modeling and prediction of salinity in the Caloosahatchee River Estuary. *Water Resources Research* 49:5804-5816.

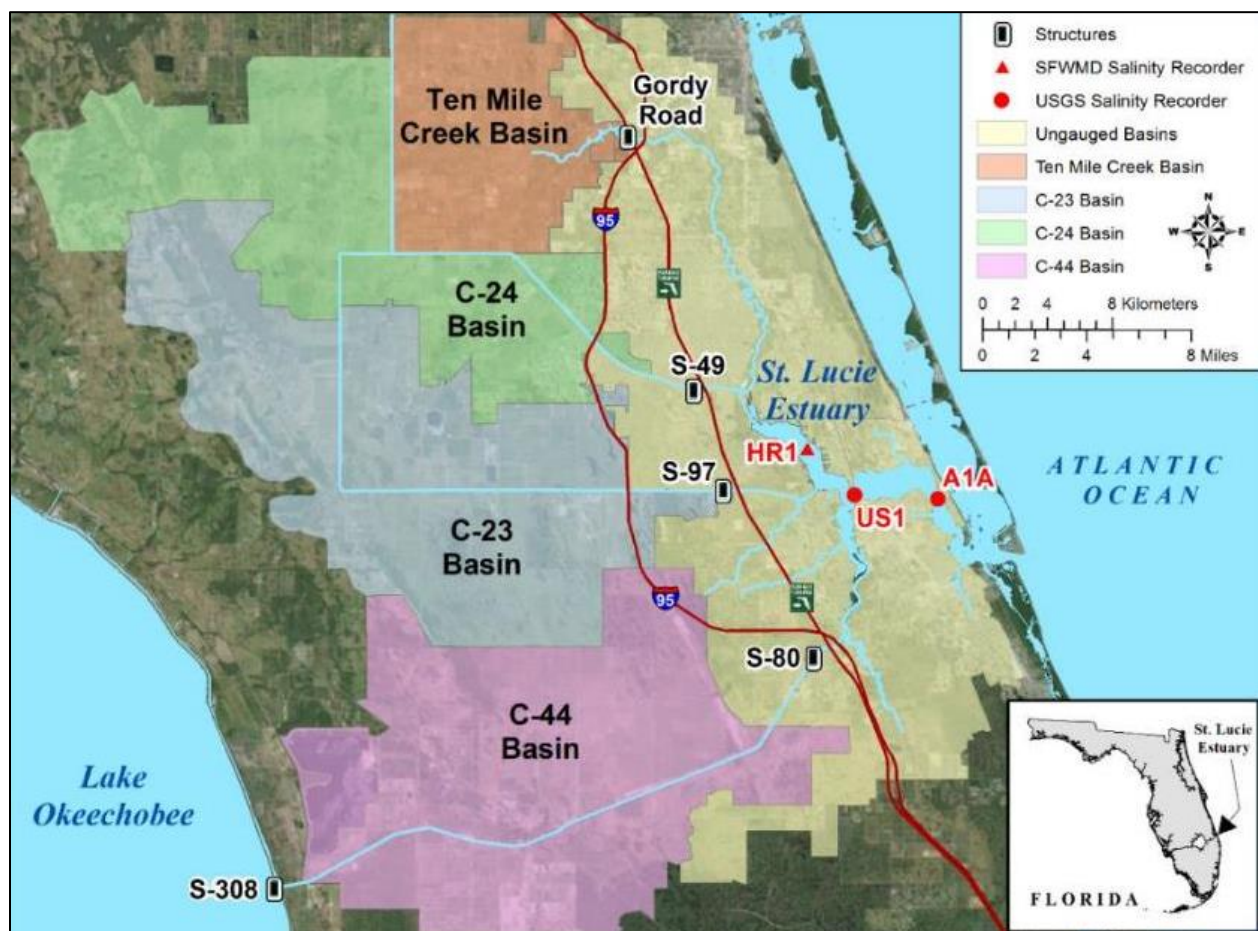


## Red Tide

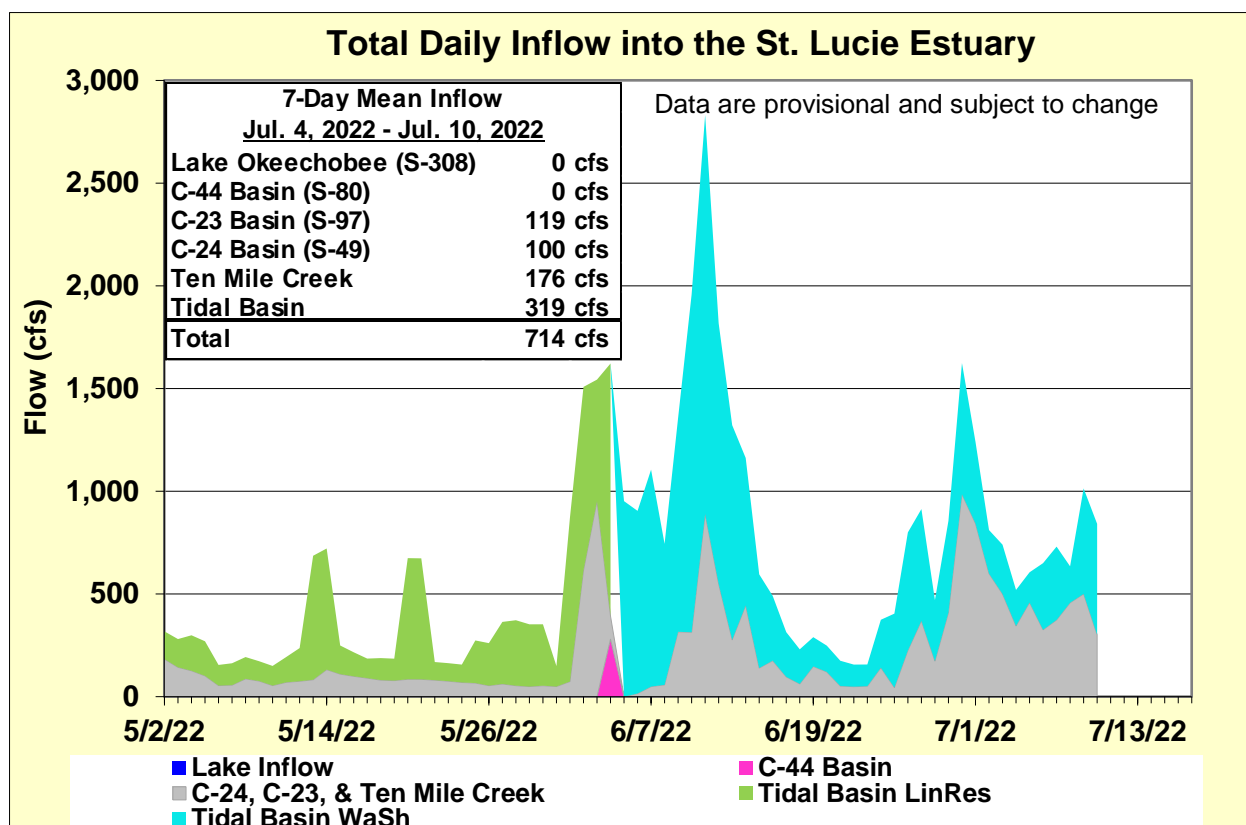
The Florida Fish and Wildlife Research Institute reported on July 8, 2022, that *Karenia brevis*, the Florida red tide dinoflagellate, was not observed in any samples collected within the District region. On the east coast, red tide was not observed in samples from St Lucie, Martin or Palm Beach counties.

## Water Management Recommendations

Lake stage is in the Base Flow Sub-Band. Tributary conditions are dry. The LORS2008 release guidance suggests up to 450 cfs release at S-79 to the Caloosahatchee River Estuary and up to 200 cfs release at S-80 to the St. Lucie Estuary.



**Figure ES-1.** Basins, water control structures and salinity monitoring sites in the St. Lucie Estuary.

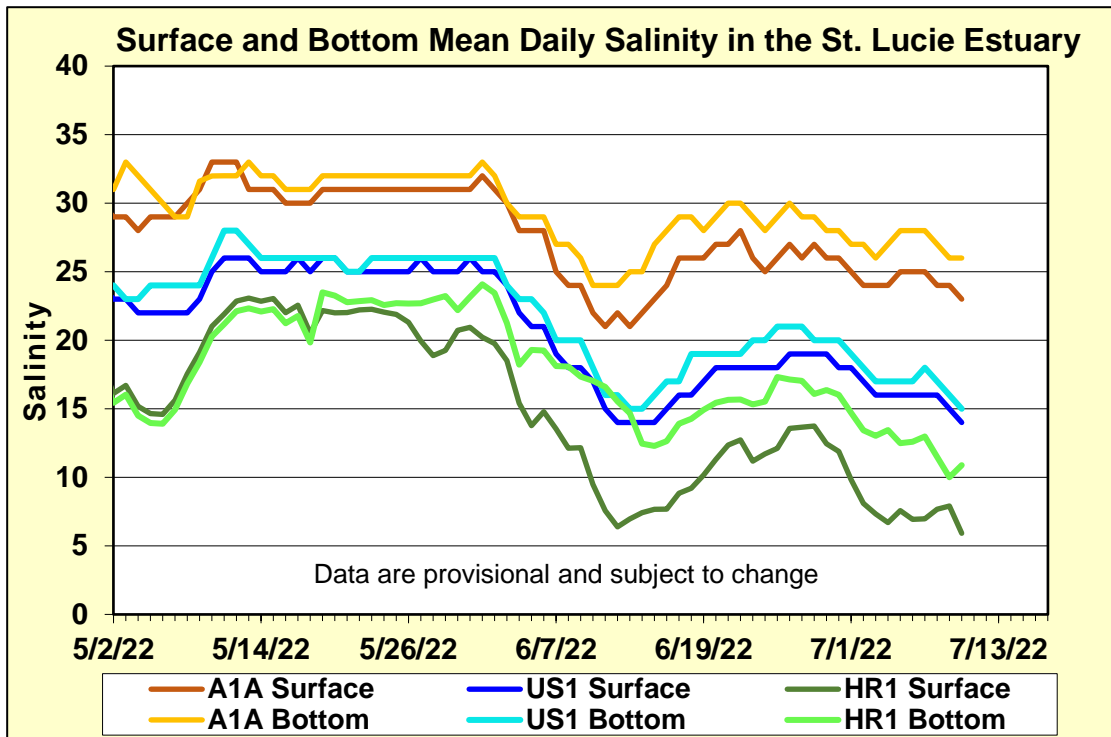


**Figure ES-2.** Total daily inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and Tidal Basins into the St. Lucie Estuary.

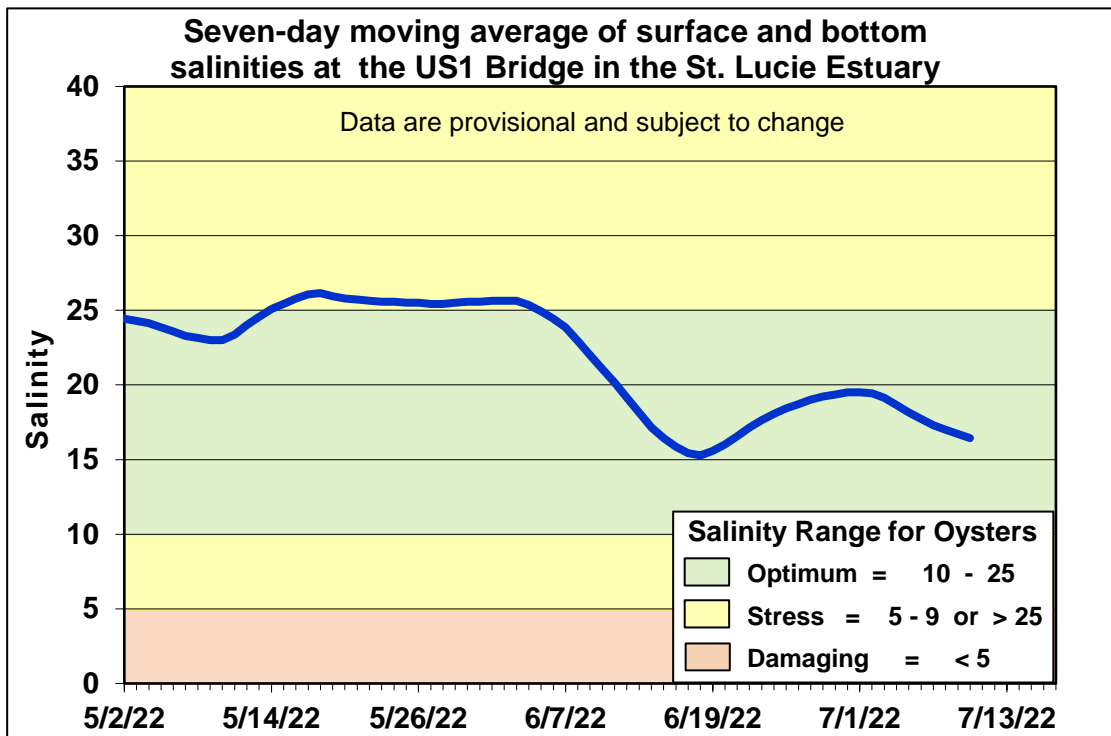
**Table ES-1.** Seven-day mean salinity at oyster monitoring sites in the St. Lucie Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope reflects the optimum salinity range for adult eastern oysters (*Crassostrea virginica*) in the estuary. Data are provisional.

Sampling Site	Surface	Bottom	Optimum Envelope
HR1 (North Fork)	<b>7.1</b> (11.0)	<b>12.0</b> (15.2)	10.0 – 25.0
US1 Bridge	<b>15.6</b> (18.0)	<b>16.7</b> (19.3)	10.0 – 25.0
A1A Bridge	<b>24.3</b> (25.4)	<b>27.1</b> (27.7)	10.0 – 25.0

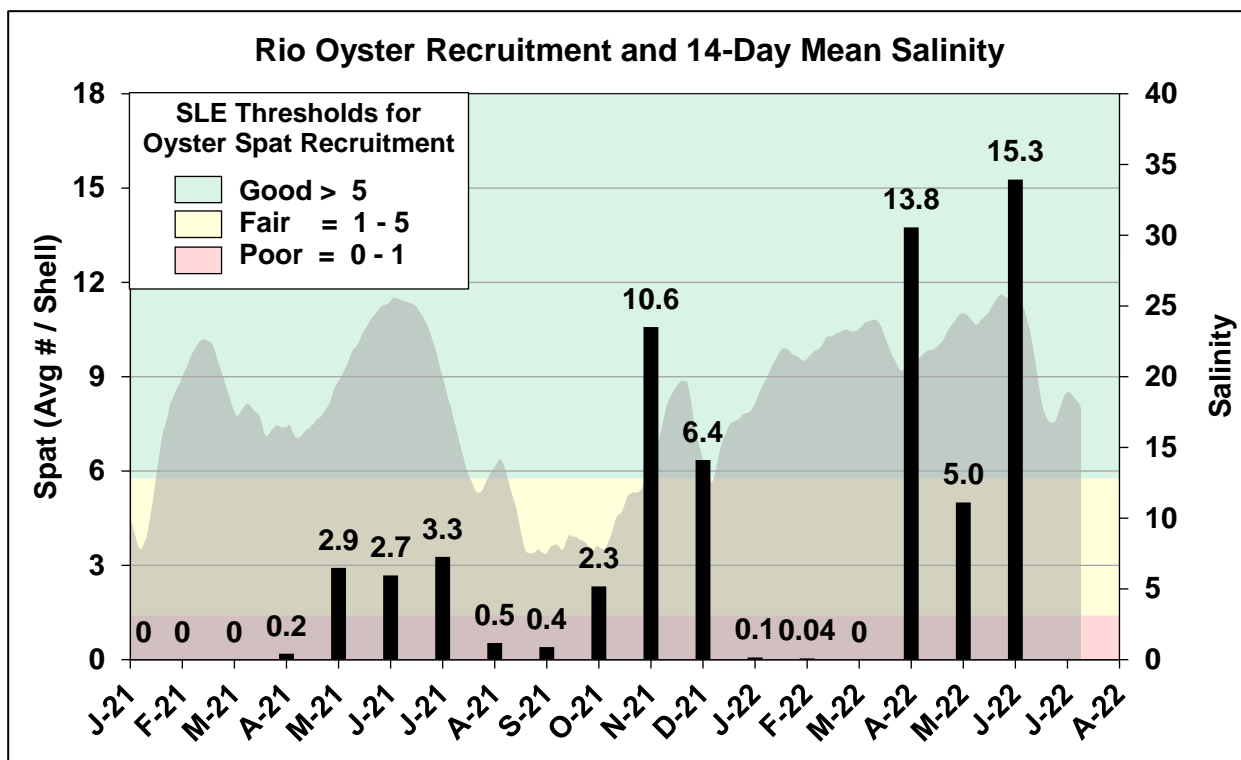




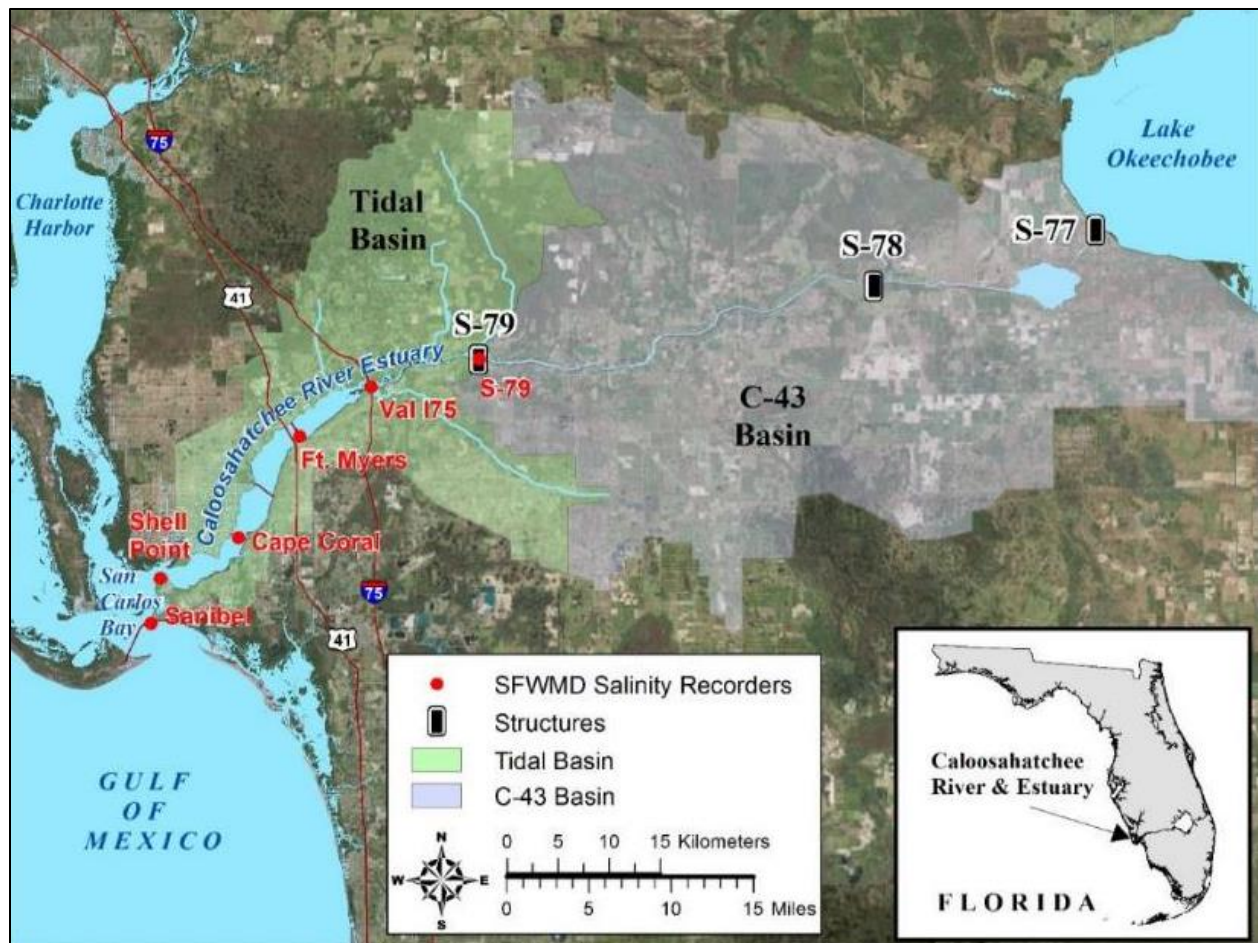
**Figure ES-3.** Mean daily salinity at the A1A, US1 and HR1 sites in the St. Lucie Estuary.



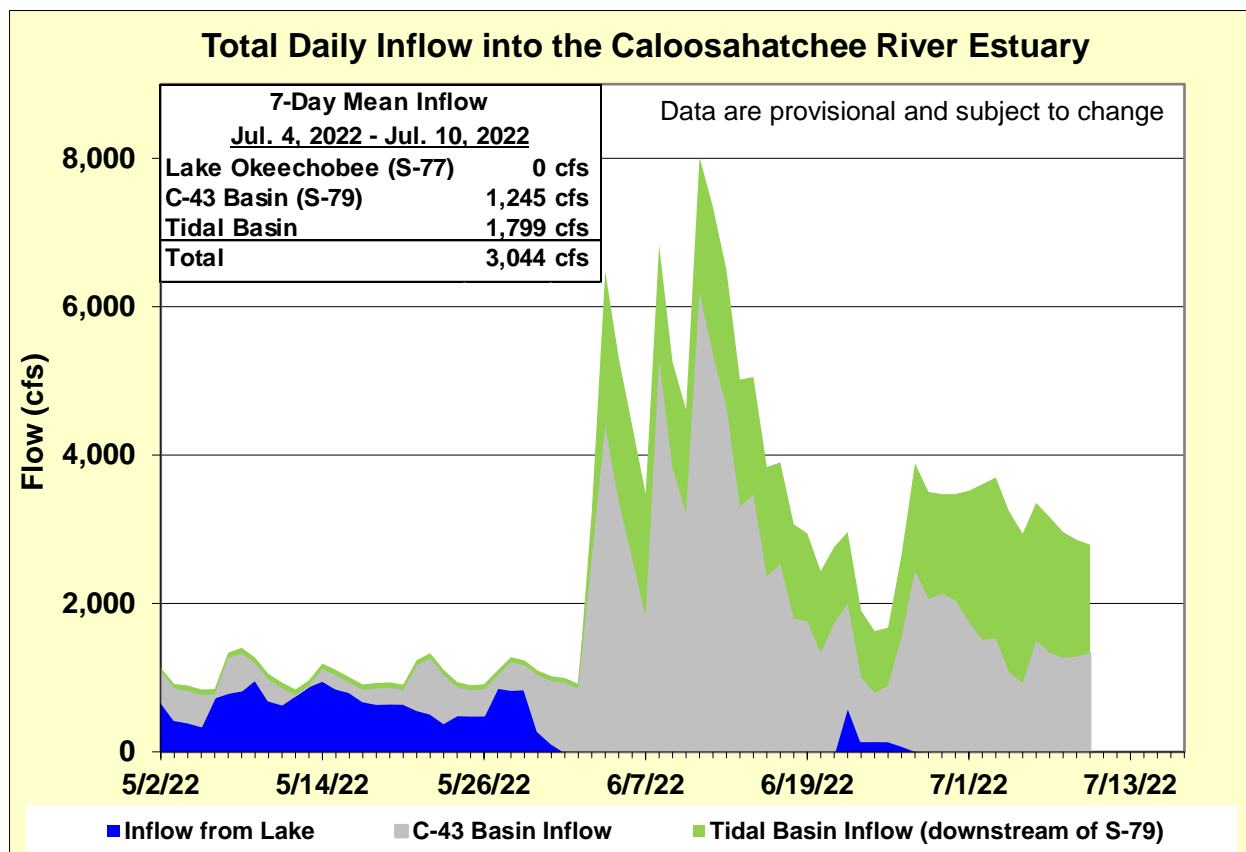
**Figure ES-4.** Seven-day moving average of the surface and bottom salinities at the US1 Bridge in the St. Lucie Estuary.



**Figure ES-5.** Mean oyster recruitment at the Rio oyster monitoring station and 14-day mean salinity at US1 Bridge.



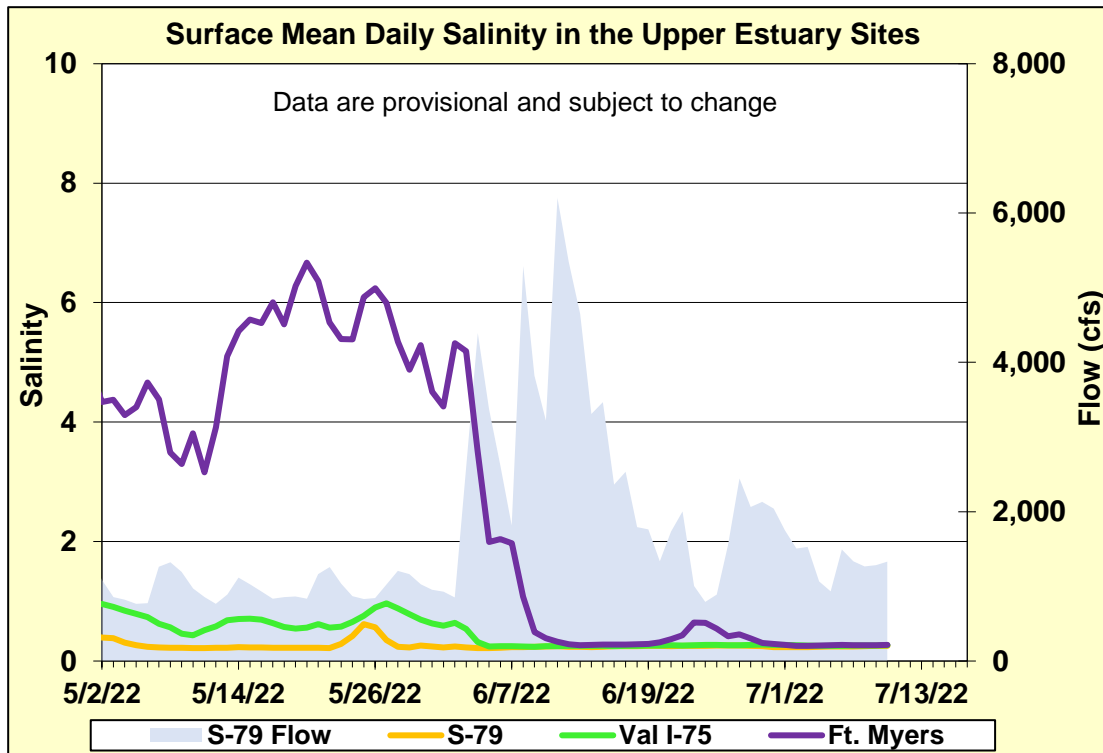
**Figure ES-6.** Basins, water control structures and salinity monitoring sites in the Caloosahatchee River Estuary.



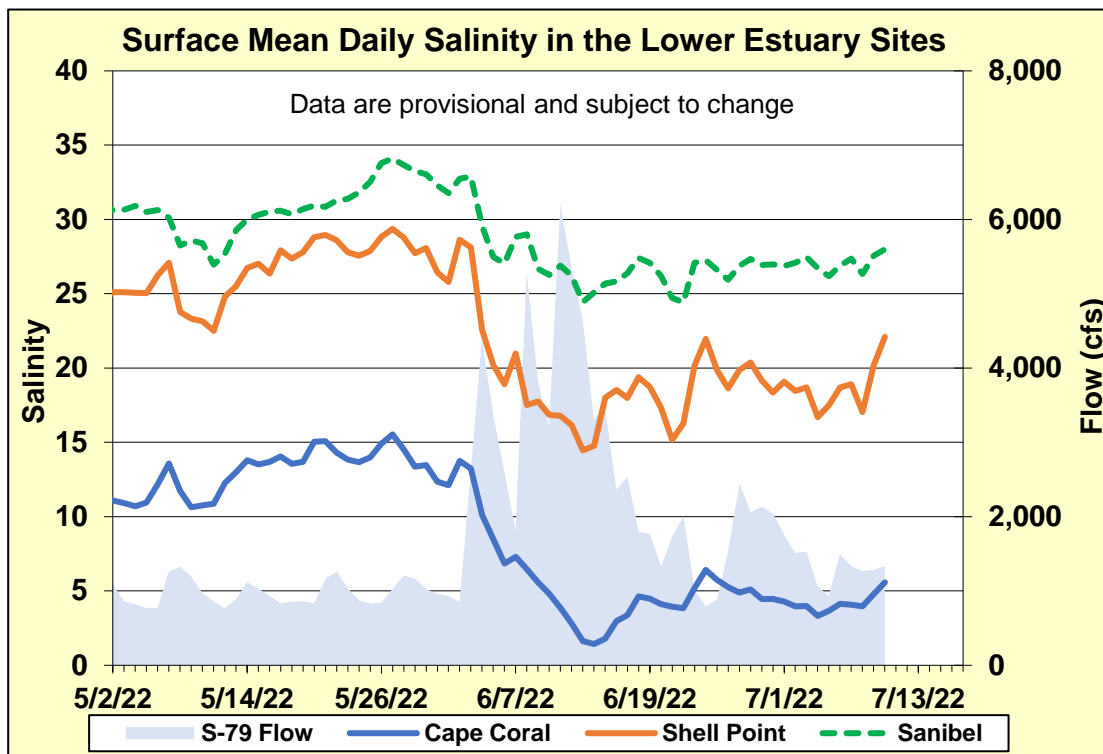
**Figure ES-7.** Total daily inflows from Lake Okeechobee, and runoff from the C-43 and Tidal basins into the Caloosahatchee River Estuary.

**Table ES-2.** Seven-day mean salinity at six monitoring sites in the Caloosahatchee River Estuary. Current means are in bold font; previous week's means are in parentheses. The envelope in the upper estuary sites is for the protection of tape grass and the envelope in the lower estuary is the optimum salinity range for adult eastern oysters (*Crassostrea virginica*). Data are provisional.

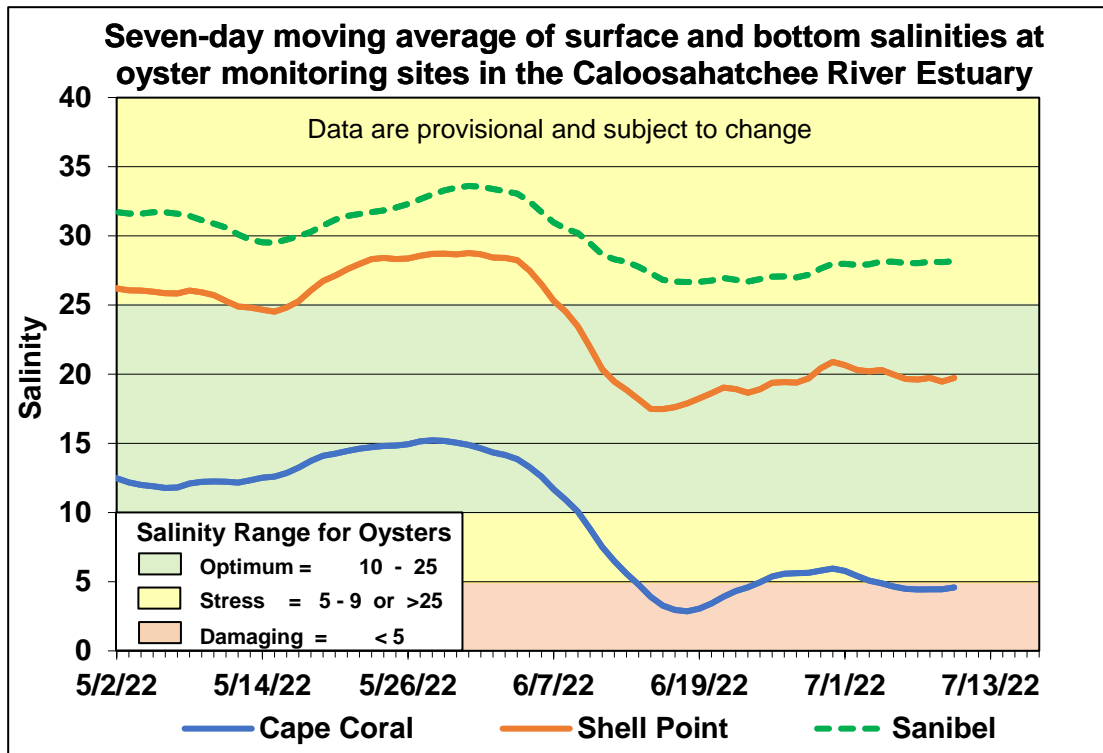
Sampling Site	Surface	Bottom	Optimum Envelope
S-79 (Franklin Lock)	<b>0.2</b> (0.2)	<b>0.2</b> (0.2)	0.0 – 10.0
Val I-75	<b>0.3</b> (0.3)	<b>0.3</b> (0.3)	0.0 – 10.0
Fort Myers Yacht Basin	<b>0.3</b> (0.3)	<b>0.3</b> (0.3)	0.0 – 10.0
Cape Coral	<b>4.2</b> (4.5)	<b>5.4</b> (5.3)	10.0 – 25.0
Shell Point	<b>18.7</b> (19.1)	<b>21.7</b> (21.5)	10.0 – 25.0
Sanibel	<b>27.0</b> (27.1)	<b>29.5</b> (29.2)	10.0 – 25.0



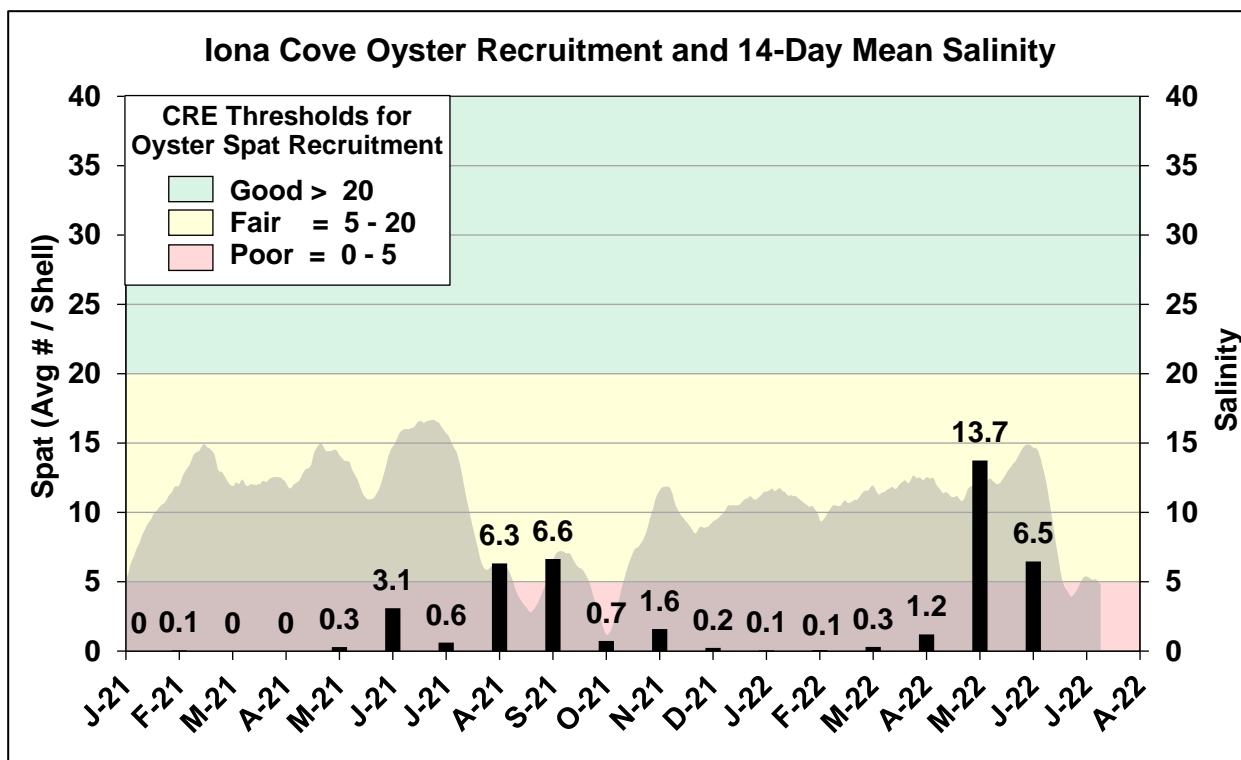
**Figure ES-8.** Mean daily salinity at upper Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.



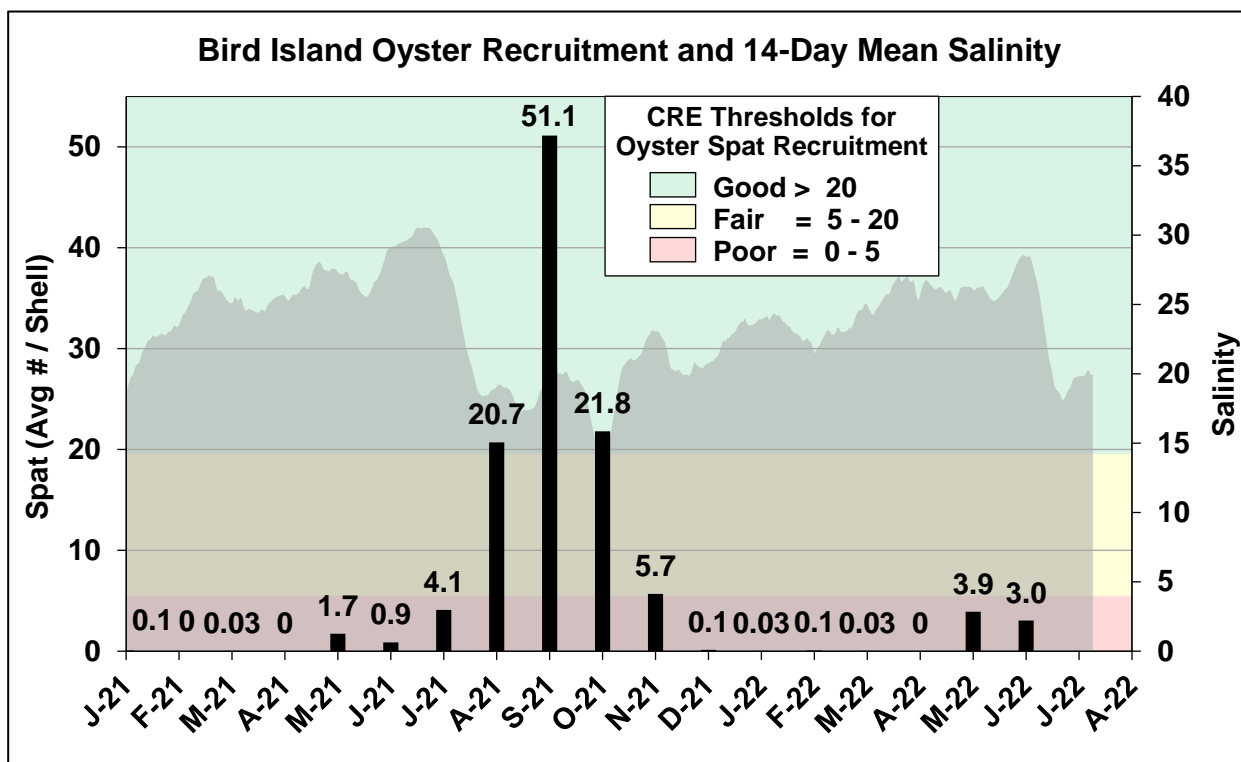
**Figure ES-9.** Mean daily surface salinity at lower Caloosahatchee River Estuary monitoring sites and mean daily flow at S-79.



**Figure ES-10.** Seven-day moving average of surface and bottom salinities at Cape Coral, Shell Point and Sanibel monitoring sites in the Caloosahatchee River Estuary.



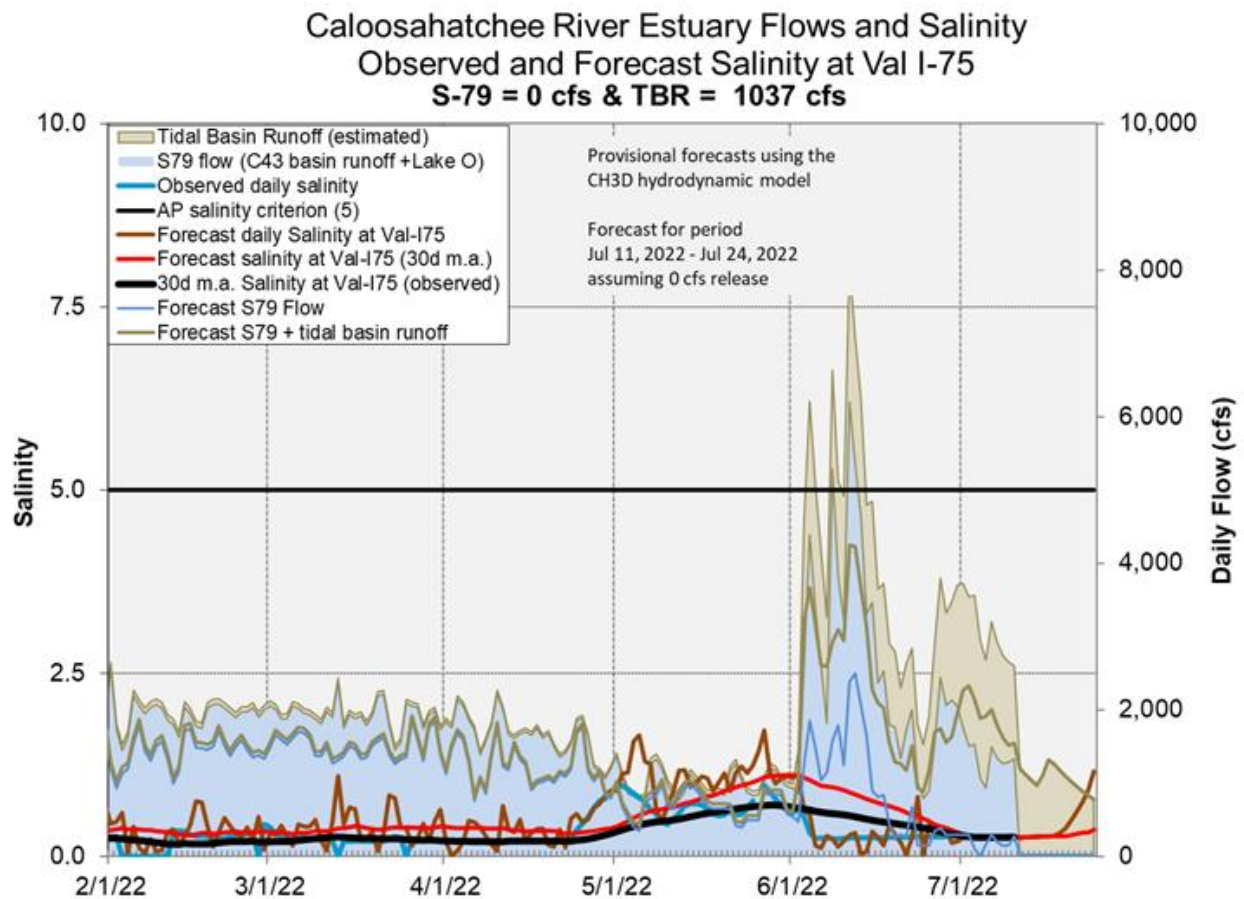
**Figure ES-11.** Mean oyster recruitment at the Iona Cove oyster monitoring station and 14-day mean salinity at Cape Coral.



**Figure ES-12.** Mean oyster recruitment at the Bird Island oyster monitoring station and 14-day mean salinity at Shell Point.

**Table ES-3.** Predicted salinity at Val I-75 in the Caloosahatchee River Estuary at the end of the forecast period for various S-79 flow release scenarios.

Scenario	Simulated S-79 Flow (cfs)	Tidal Basin Runoff (cfs)	Daily Salinity	30-Day Mean Salinity
A	0	1037	1.2	0.4
B	450	1037	0.6	0.3
C	800	1037	0.4	0.3
D	1000	1037	0.3	0.3
E	1500	1037	0.3	0.3
F	2000	1037	0.3	0.3



**Figure ES-13.** Forecasted Val I-75 site surface salinity assuming no pulse release at S-79.



## Stormwater Treatment Areas

**STA-1E:** STA-1E Western Flow-way is offline for post-construction vegetation grow in. Operational restrictions are in place in STA-1E Central and Eastern Flow-ways for vegetation management activities. Online treatment cells are near or above target stage and vegetation in the flow-ways is stressed and highly stressed. The 365-day phosphorus loading rates (PLRs) are high for the Eastern Flow-way and very high for the Central Flow-way (**Figure S-1**).

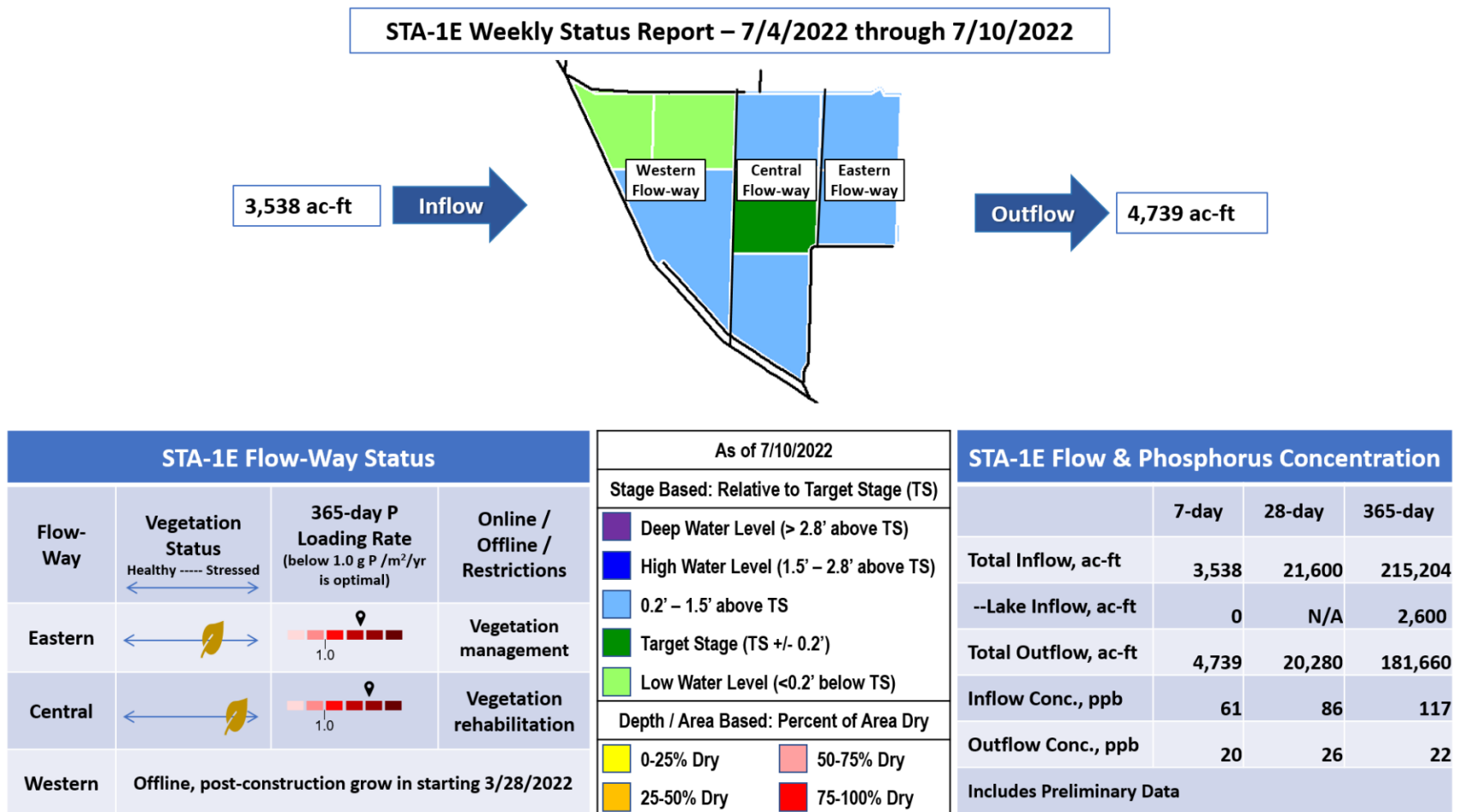
**STA-1W:** Operational restrictions are in place in STA-1W Western, Eastern, and Northern Flow-ways for vegetation management activities. Most treatment cells are near target stage. Vegetation in the flow-ways is stressed and highly stressed. The 365-day PLRs for the Northern, Western, and Eastern Flow-ways are below 1.0 g/m<sup>2</sup>/year (**Figure S-2**).

**STA-2:** STA-2 Flow-way 2 is offline for construction activities. Operational restrictions are in place in STA-2 Flow-ways 3 and 4 for vegetation management activities. Online treatment cells are near or above target stage. Vegetation in Flow-ways 1 and 3 is stressed, and in Flow-ways 2, 4 and 5 is highly stressed. The 365-day PLRs for Flow-ways 1, 4 and 5 are below 1.0 g/m<sup>2</sup>/year. The 365-day PLR for Flow-way 3 is high (**Figure S-3**).

**STA-3/4:** STA-3/4 Eastern Flow-way is offline for vegetation rehabilitation/drawdown. Online treatment cells are above target stage. Vegetation in the Eastern and Central Flow-ways is highly stressed and in the Western Flow-way is stressed. The 365-day PLRs for the Central and Western Flow-ways are below 1.0 g/m<sup>2</sup>/year (**Figure S-4**).

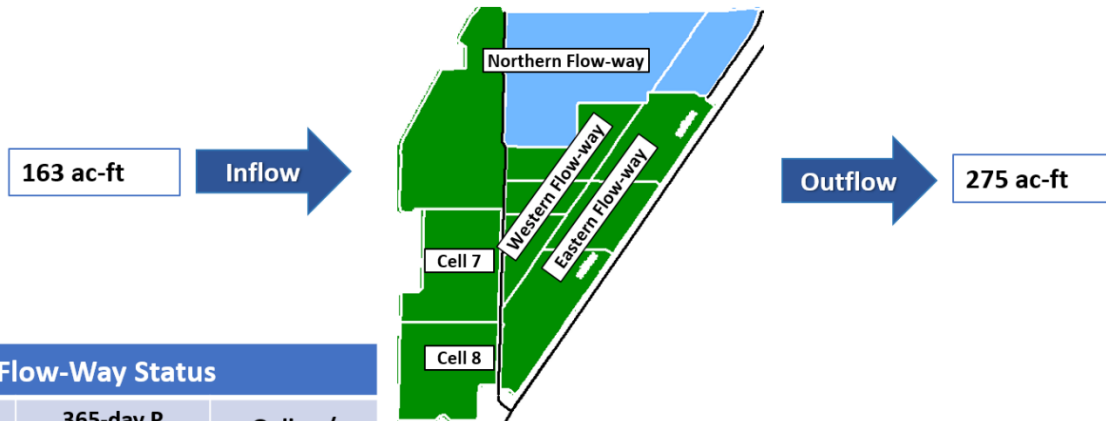
**STA-5/6:** STA-5/6 Flow-way 4 is offline for vegetation management activities. Treatment cells are near or below target stage. All treatment cells have highly stressed vegetation conditions except Flow-ways 7 and 8 which are healthy. The 365-day PLRs for online flow-ways are below 1.0 g/m<sup>2</sup>/year. (**Figure S-5 and S-6**).

For definitions on STA operational language see glossary following figures.



**Figure S-1.** STA-1E Weekly Status Report

# STA-1W Weekly Status Report – 7/4/2022 through 7/10/2022



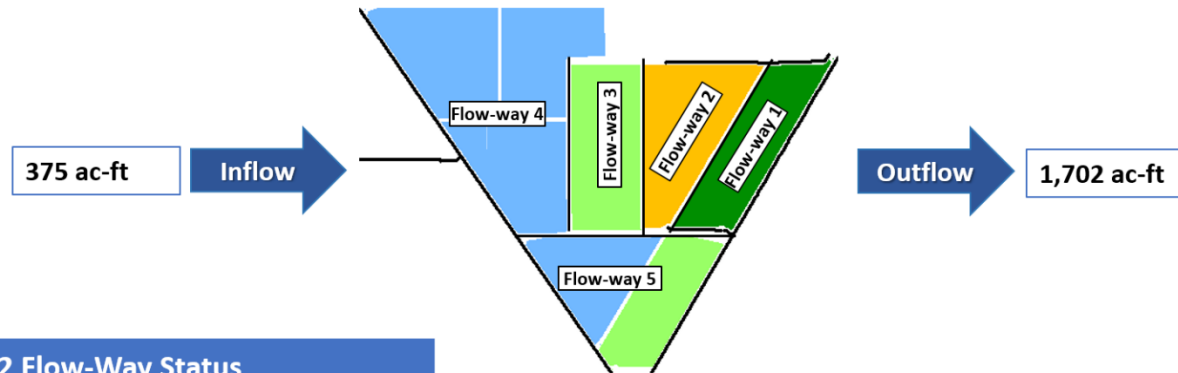
STA-1W Flow-Way Status			
Flow-Way	Vegetation Status Healthy --- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
Northern			Vegetation management
Western			Vegetation management
Eastern			Vegetation management
Cell 7		N/A	Online
Cell 8		N/A	Construction

As of 7/10/2022	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-1W Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	163	14,623	76,485
--Lake Inflow, ac-ft	0	N/A	3,000
Total Outflow, ac-ft	275	22,620	77,925
Inflow Conc., ppb	103	188	176
Outflow Conc., ppb	21	24	24
Includes Preliminary Data			

**Figure S-2.** STA-1W Weekly Status Report

# STA-2 Weekly Status Report – 7/4/2022 through 7/10/2022



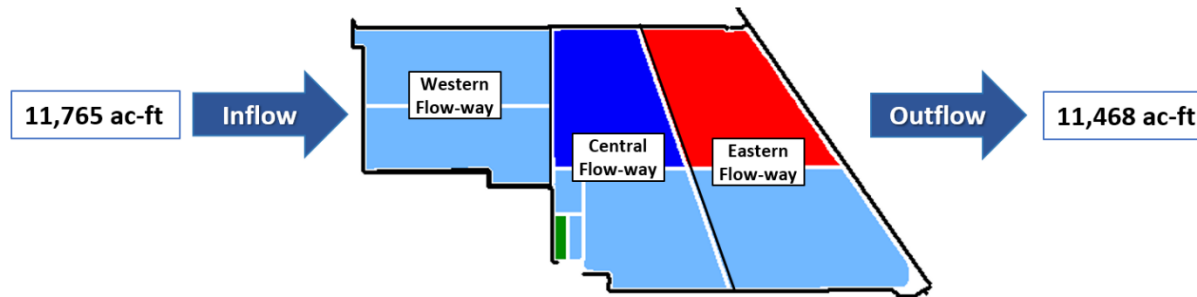
STA-2 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
1			Online
2	Offline, construction activities as of 9/7/2021		
3			Vegetation Rehab
4			Vegetation Rehab
5			Online

As of 7/10/2022	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-2 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	375	33,874	328,240
--Lake Inflow, ac-ft	0	N/A	28,100
Total Outflow, ac-ft	1,702	60,786	362,247
Inflow Conc., ppb	34	174	104
Outflow Conc., ppb	20	40	22
Includes Preliminary Data			

**Figure S-3.** STA-2 Weekly Status Report

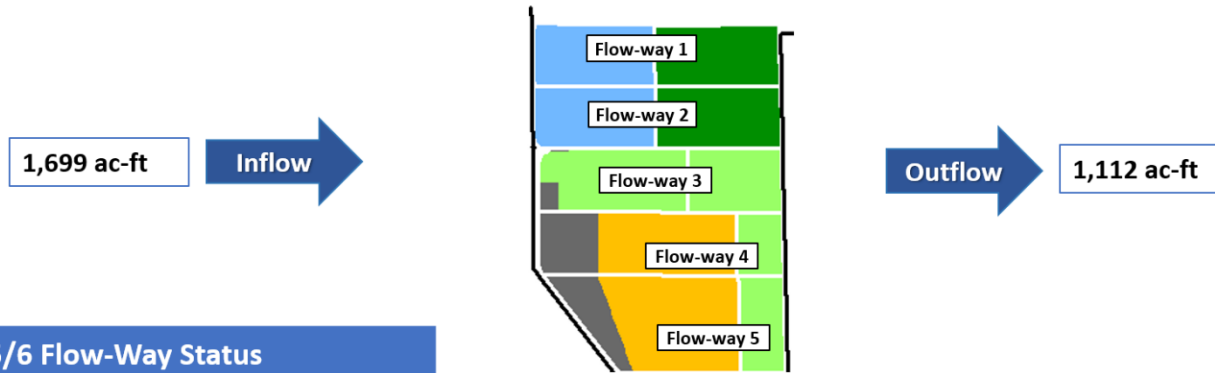
# STA-3/4 Weekly Status Report – 7/4/2022 through 7/10/2022



STA-3/4 Flow-Way Status				STA-3/4 Flow & Phosphorus Concentration			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions	As of 7/10/2022			
				Stage Based: Relative to Target Stage (TS)			
Eastern	Offline, vegetation management drawdown as of 3/1/2021			<div> <div>Deep Water Level (&gt; 2.8' above TS)</div> <div>High Water Level (1.5' – 2.8' above TS)</div> <div>0.2' – 1.5' above TS</div> <div>Target Stage (TS +/- 0.2')</div> <div>Low Water Level (&lt;0.2' below TS)</div> </div>			
				<div>Depth / Area Based: Percent of Area Dry</div> <div> <div>0-25% Dry</div> <div>25-50% Dry</div> <div>50-75% Dry</div> <div>75-100% Dry</div> </div>			
Central	← →	1.0	Online				
Western	← →	1.0	Online				
				Total Inflow, ac-ft	11,765	59,250	346,222
				--Lake Inflow, ac-ft	0	N/A	5,400
				Total Outflow, ac-ft	11,468	69,859	324,987
				Inflow Conc., ppb	30	65	88
				Outflow Conc., ppb	11	14	14
				Includes Preliminary Data			

**Figure S-4.** STA-3/4 Weekly Status Report

# STA-5/6 Weekly Status Report – 7/4/2022 through 7/10/2022



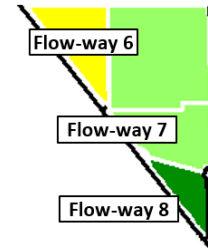
STA-5/6 Flow-Way Status			
Flow-Way	Vegetation Status Healthy ----- Stressed	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions
1	← →		Online
2	← →		Online
3	← →		Online
4	Offline, vegetation management starting 01/24/2022		
5	← →		Online

As of 7/10/2022	
Stage Based: Relative to Target Stage (TS)	
	Deep Water Level (> 2.8' above TS)
	High Water Level (1.5' – 2.8' above TS)
	0.2' – 1.5' above TS
	Target Stage (TS +/- 0.2')
	Low Water Level (<0.2' below TS)
Depth / Area Based: Percent of Area Dry	
	0-25% Dry
	25-50% Dry
	50-75% Dry
	75-100% Dry

STA-5/6 Flow & Phosphorus Concentration			
	7-day	28-day	365-day
Total Inflow, ac-ft	1,699	5,607	183,334
--Lake Inflow, ac-ft	0	N/A	0
Total Outflow, ac-ft	1,112	3,139	172,415
Inflow Conc., ppb	124	157	240
Outflow Conc., ppb	19	23	49
Includes Preliminary Data			

**Figure S-5.** STA-5/6 Weekly Status Report (Flow-ways 1 – 5)

STA-5/6 Weekly Status Report – 7/4/2022 through 7/10/2022



STA-5/6 Flow-Way Status				As of 7/10/2022	
Flow-Way	Vegetation Status Healthy ----- Stressed ←-----→	365-day P Loading Rate (below 1.0 g P /m <sup>2</sup> /yr is optimal)	Online / Offline / Restrictions	Stage Based: Relative to Target Stage (TS)	
				<div>Deep Water Level (&gt; 2.8' above TS)</div> <div>High Water Level (1.5' – 2.8' above TS)</div> <div>0.2' – 1.5' above TS</div> <div>Target Stage (TS +/- 0.2')</div> <div>Low Water Level (&lt;0.2' below TS)</div>	
6	←-----→		Online		
7	←-----→		Online		
8	←-----→		Online		
				Depth / Area Based: Percent of Area Dry	
				<div>0-25% Dry</div> <div>25-50% Dry</div>	<div>50-75% Dry</div> <div>75-100% Dry</div>

Figure S-6. STA-5/6 Weekly Status Report (Flow-ways 6 – 8)

## Basic Concepts and Definitions for STA Weekly Status Report

- **Inflow:** Sum of flow volume at all inflow structures to an STA.
- **Lake Inflow:** Portion of the STA total inflow volume that originates from Lake Okeechobee.
- **Outflow:** Sum of flow volume at outflow structures from an STA.
- **Total Phosphorus (TP):** Total mass of phosphorus in all its forms; including particulate, dissolved, etc.
- **Inflow Concentration:** TP concentration is the mass of TP in micrograms per liter of water,  $\mu\text{g/L}$  or ppb. Inflow concentration refers to the flow-weighted mean TP from all inflow structures over a period of time.
- **Outflow Concentration:** The flow-weighted mean TP from all outflow structures over a period of time. The outflow concentration represents the reduction of inflow TP achieved by STA treatment of the inflow water.
- **WQBEL:** The STA outflow concentration that is required upon completion of the Restoration Strategies projects by December 2025. The outflow concentration shall not exceed 13 ppb as an annual flow weighted mean in more than 3 out of 5 water years on a rolling basis and shall not exceed 19 ppb as an annual flow weighted in any water year.
- **Flow-Way (FW):** One or more treatment cells connected in series. Cells typically have emergent aquatic vegetation (EAV) in the front portion of the flow-way followed by a mix of EAV and submerged aquatic vegetation (SAV)
- **Vegetation Status:** Healthy means the vegetation condition is good and will allow the STA to perform as designed. Stressed means the vegetation is showing signs of poor health, such as browning or areas of vegetation die-off, or the cell contains undesirable vegetation such as floating exotic vegetation requiring treatment. The TP reduction capability of the STA is affected when the vegetation condition is poor.
- **Phosphorus Loading Rate (PLR):** Mass of inflow TP in grams, divided by total treatment area of STA in square meters, per year. In general, a 365-day value of less than 1.0 is needed for an STA to perform optimally. A PLR of 2.0 is considered very high and a PLR of 3.0 is considered extremely high. The TP reduction capability of the STA is affected when the PLR is high, very high and extremely high.
- **Online:** Online status means the FW can receive and treat inflow.
- **Online with Restriction:** The FW can receive and treat inflow, but the amount of flow or water level may be limited temporarily. For example, a vegetation rehabilitation effort may require reduced flows through an area while the new plants are establishing, or nesting by protected species may require a certain water level not to be exceeded.
- **Offline:** The FW is unable to receive and treat inflow due to repairs, construction, or other prohibitive reasons.
- **Depth:** Difference between the average surface water level in a cell and the average ground elevation in that cell. Target depths, or depths between flow events, are between 1.25 ft to 1.5 ft. As depth approaches or drops below zero, an increasing percentage of the cell is considered dry and STA conditions deteriorate. An increase in depth above target depth is expected with increasing flow. However, as depth increases much above the target depth and is sustained over a period of time, it can be detrimental to vegetation health and overall STA treatment performance.
- **Note:** The data provided in this summary report were developed using a combination of provisional and quality-assured flow and water quality data. In some cases, best professional judgment was used to estimate missing data and revise questionable data. Values provided are not considered final but are appropriate for use in STA operational decision-making.



## **Everglades**

### ***Water Conservation Area Regulation Schedules***

WCA-1: Stage at the 1-8C continued increasing over the week. The average on Sunday was 0.66 feet above the flat Zone A1 regulation line. WCA-2A: Stage continued its rapid descent at the 2.17 gauge last week. The average on Sunday was 0.98 feet above the rising regulation line. WCA-3A: Last week the Three Gauge Average stages ascended in parallel and above the Zone A regulation line. The average stage was 0.26 feet above the rising regulation line on Sunday. WCA-3A North: At gauge 62 (Northwest corner) stage change flattened last week, the average on Sunday was 0.50 feet below the rising Upper schedule line. (**Figures EV-1 through EV-4**).

### ***Water Depths***

The SFWDAT tool indicates that surface water is now expressed across WCA-3A North. The upper reaches of the L-67s are ponding. BCNP stages remain above ground in most of that basin. North to South hydrologic connectivity remains strong within the eastern sloughs of Everglades National Park, less so in the western sloughs. Comparing current WDAT water depths to one month ago, stages are significantly deeper in WCA-3A; lower in WCA-1, WCA-2A and 2B, and in most of ENP. Looking back a year ago, only WCA-2A is shallower in the north; with the rest of the EPA deeper particularly downstream of the S-11s and along the upper reaches of the L-67s (**Figure EV-5 and Figure EV-6**). Comparing current conditions to the 20-year median: Northern WCA-2A is below average, most of WCA-3A is near average, ENP remains for the most part in the upper percentiles. (**Figure EV-7**)

### ***Taylor Slough and Florida Bay***

Taylor Slough and Florida Bay received a total of 5.45 inches of rain in the past week, slightly higher than for the previous week. Stages in Taylor Slough have remained relatively stable, with an average change of -0.116 feet (**Figure EV-8 and Figure EV-9**). Individual stage gauge changes ranged from -0.221 at TSB in the northern slough to -0.051 feet in the southeastern region (EPSW). The Slough is now 5.39 inches higher than its historical average for this time of year (pre-Florida Bay initiative which started in 2017). Conditions continue to be highly favorable for moving water downstream through the Slough this year as the rains continue.

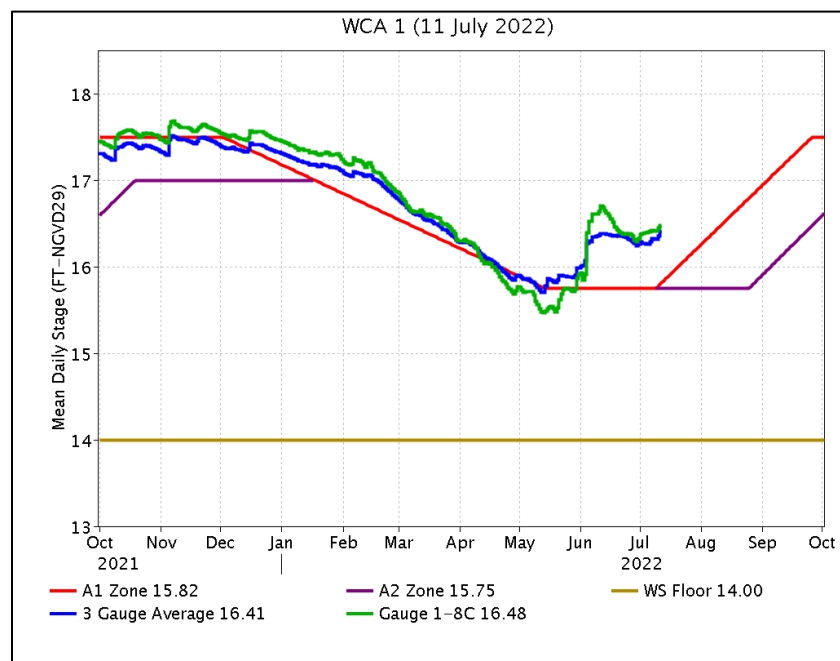
Overall, Florida Bay salinity average changed by -0.5 over the week ending in 7/10. Salinities continued to slightly decrease in eastern, central and western regions of the bay. Individual station changes throughout the bay ranged from -5.2 in Garfield Bight (GB), where highest weekly rain was recorded, to +12.2 in Trout Creek (TC) in the eastern region (**Figure EV-8**). In all regions salinities remained at or near the 25th percentile (**Figure EV-10**). Florida Bay salinity is 4.13 lower than its historical average for this time of year.

## Water Management Recommendations

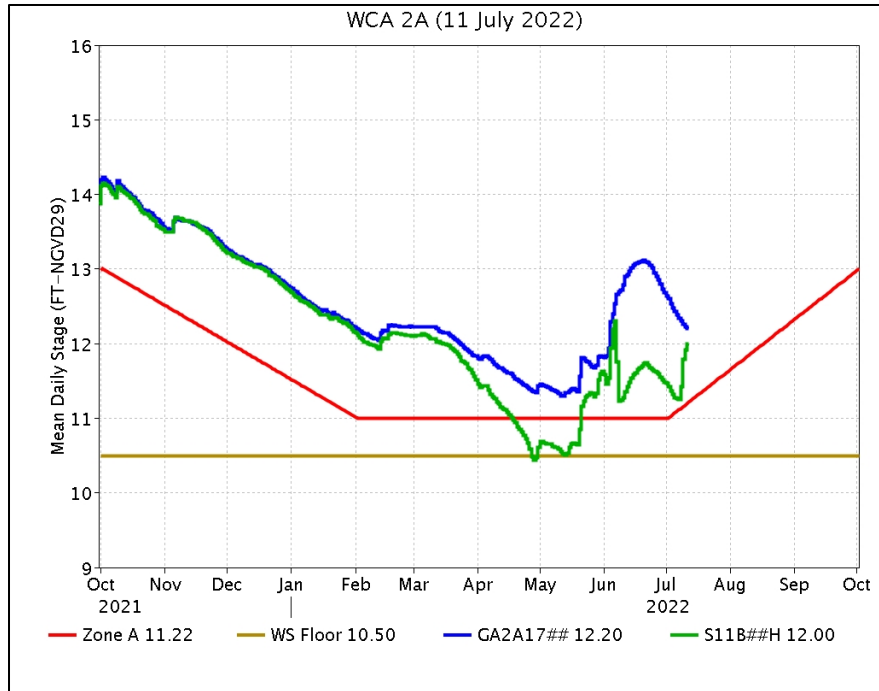
Balancing inflows and outflows to slow the rate of descension while alleviating higher than average depths within the marsh of WCA-2A would have an ecological benefit. If conditions allow, distributing flows both into the northern perimeter of WCA-3A and making use of the S-150 is ecologically better than using the northwestern structures alone. Taylor Slough stages remain in a good place to expedite freshwater deliveries to the south as the wet season progresses. Individual regional recommendations can be found in **Table EV-2**.

**Table EV-2.** Previous week's rainfall and water depth changes in Everglades basins.

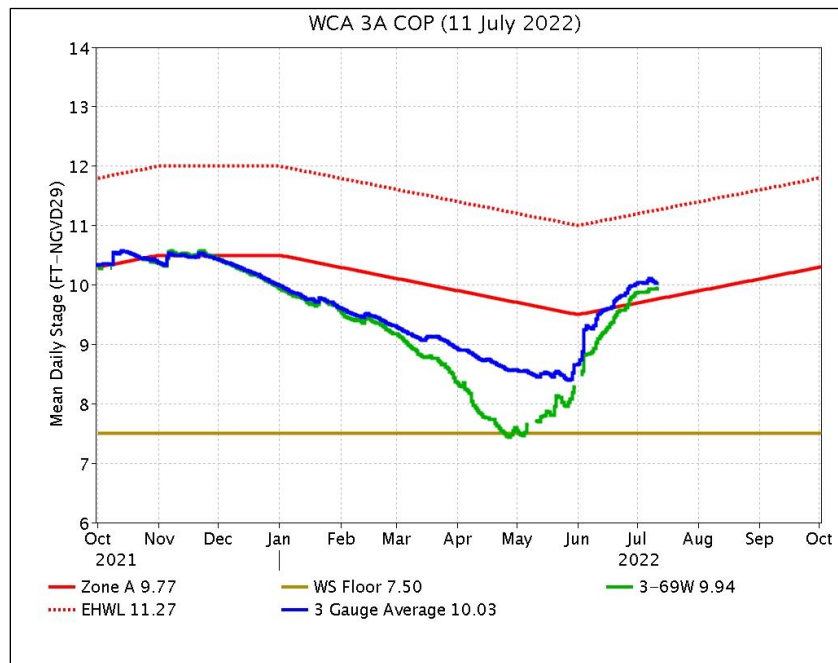
Everglades Region	Rainfall (inches)	Stage change (feet)
WCA-1	1.77	+0.15
WCA-2A	1.46	-0.30
WCA-2B	1.62	-0.03
WCA-3A	1.18	-0.01
WCA-3B	0.73	+0.00
ENP	1.94	+0.03



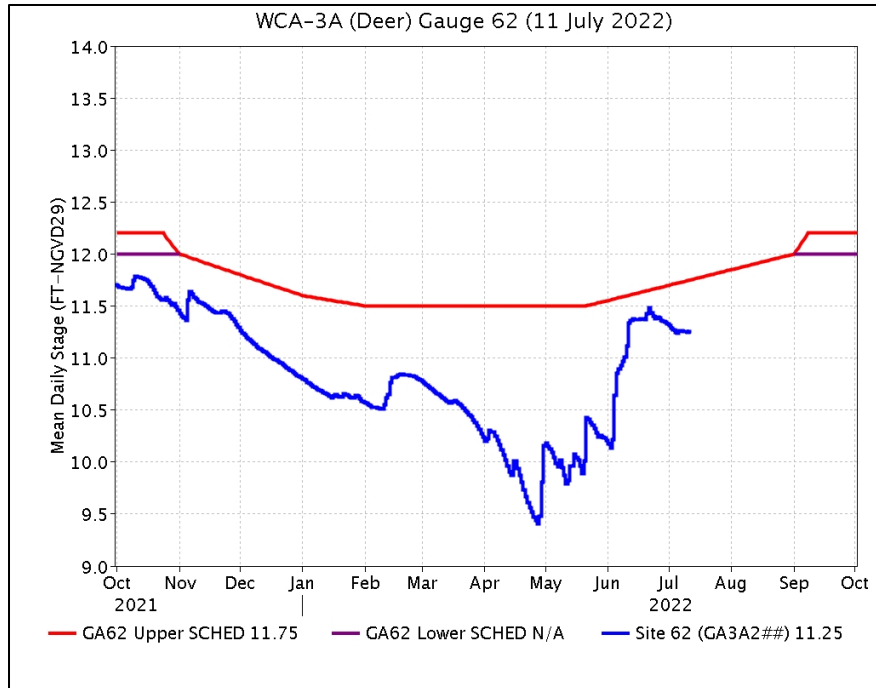
**Figure EV-1.** WCA-1 stage hydrographs and regulation schedule.



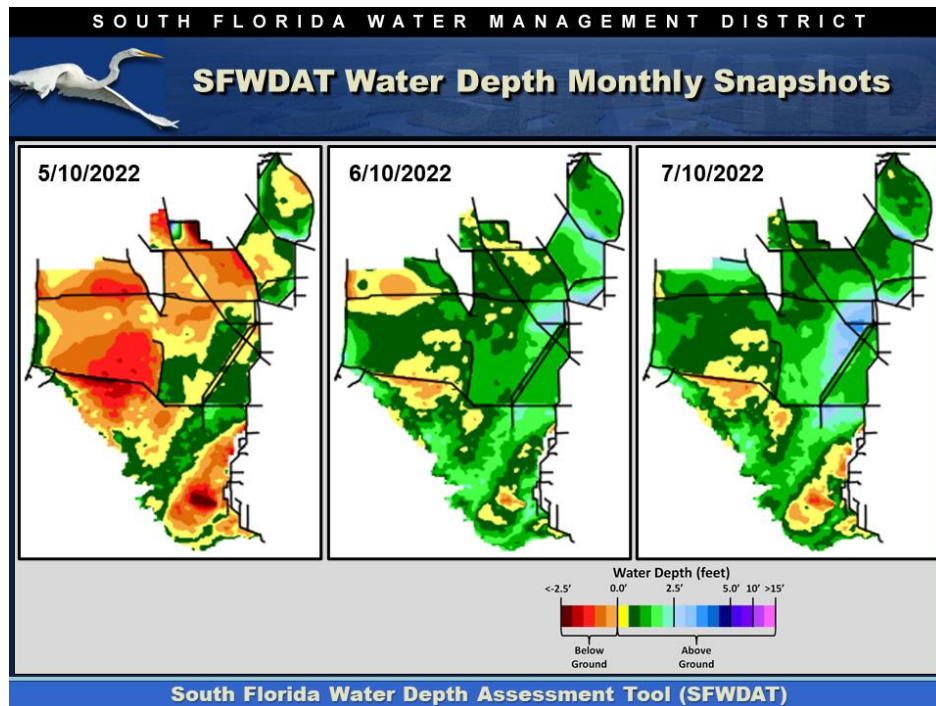
**Figure EV-2.** WCA-2A stage hydrographs and regulation schedule.



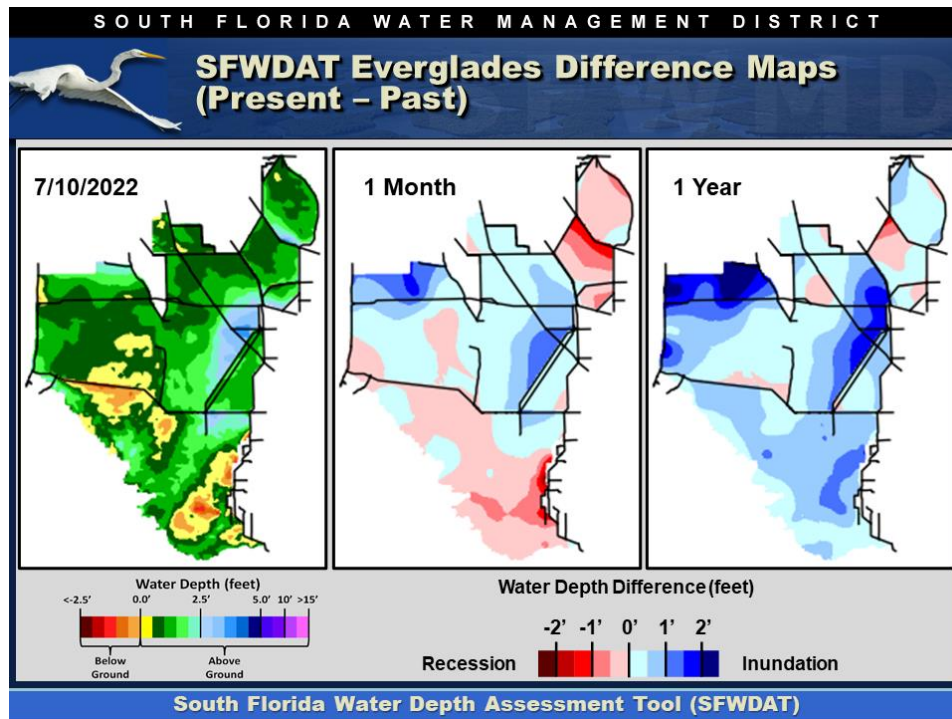
**Figure EV-3.** WCA-3A stage hydrographs (three-gauge average, S-333 headwater) and regulation schedule.



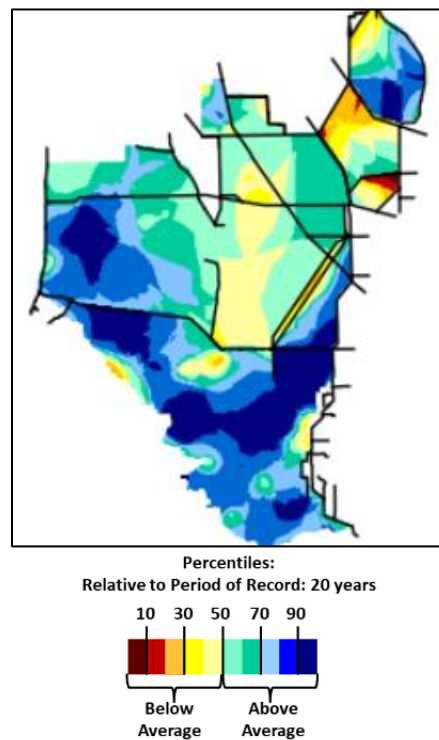
**Figure EV-4.** WCA-3A stage hydrograph (Deer gauge; Site 62) and CA62 regulation schedule.



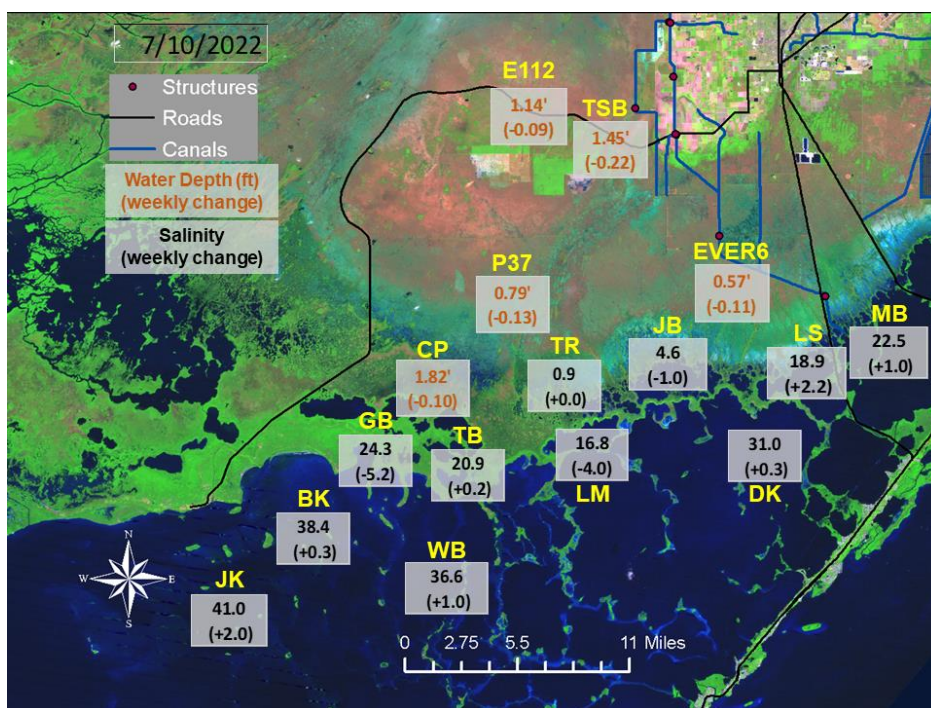
**Figure EV-5.** Everglades water depths from two months ago (left), one month ago (center) and present (right), based on SFWDAT.



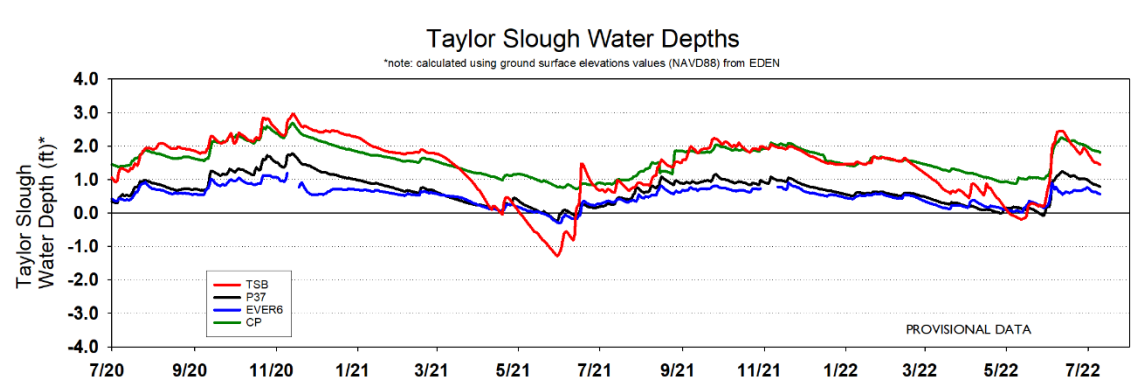
**Figure EV-6.** Present Everglades water depths (left) and water depth changes from one month (center) and one year (right) ago, based on SFWDAT.



**Figure EV-7.** Present water depths (7/10/2022) compared to the day of year median over the previous 20 years.

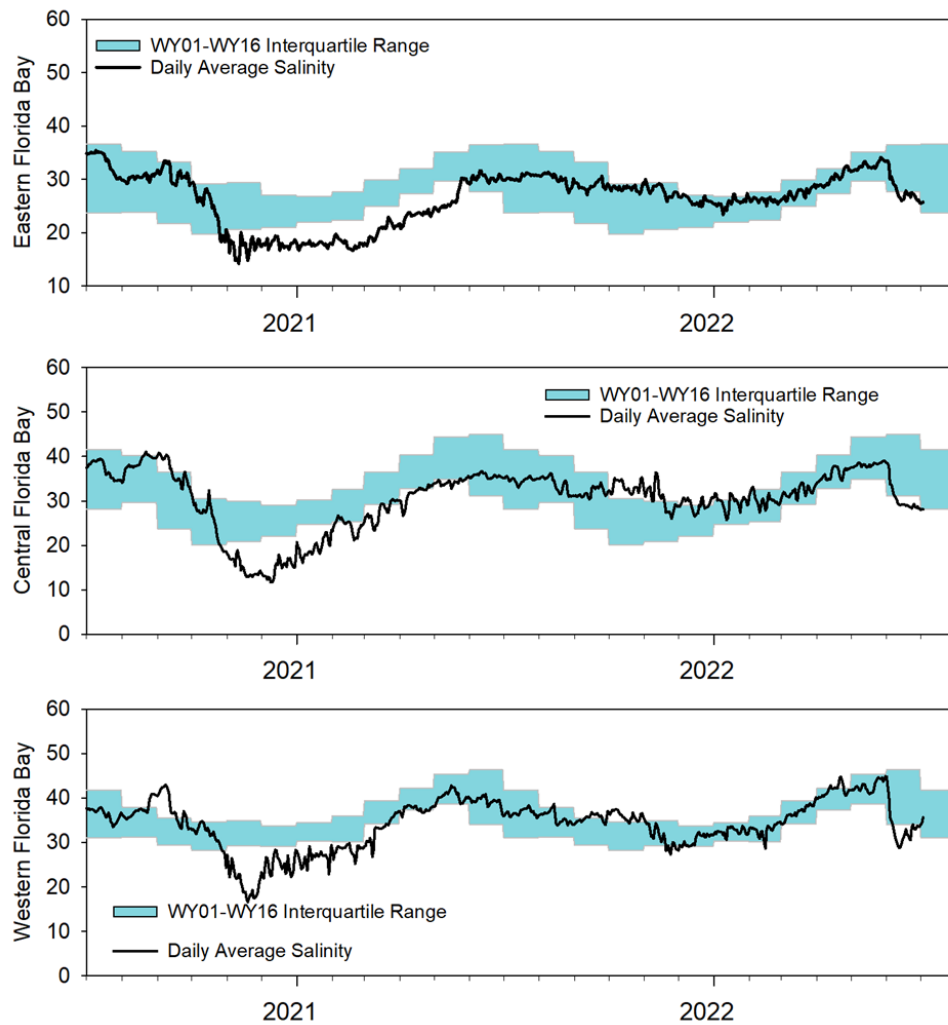


**Figure EV-8.** Taylor Slough water depths with changes since a week ago and Florida Bay salinities with changes since a week ago.



**Figure EV-9.** Taylor Slough water depth time series.





**Figure EV-10.** Eastern (top panel), Central (middle panel) and Western (bottom panel) Florida Bay daily average salinities with interquartile (25-75 percentile) ranges.

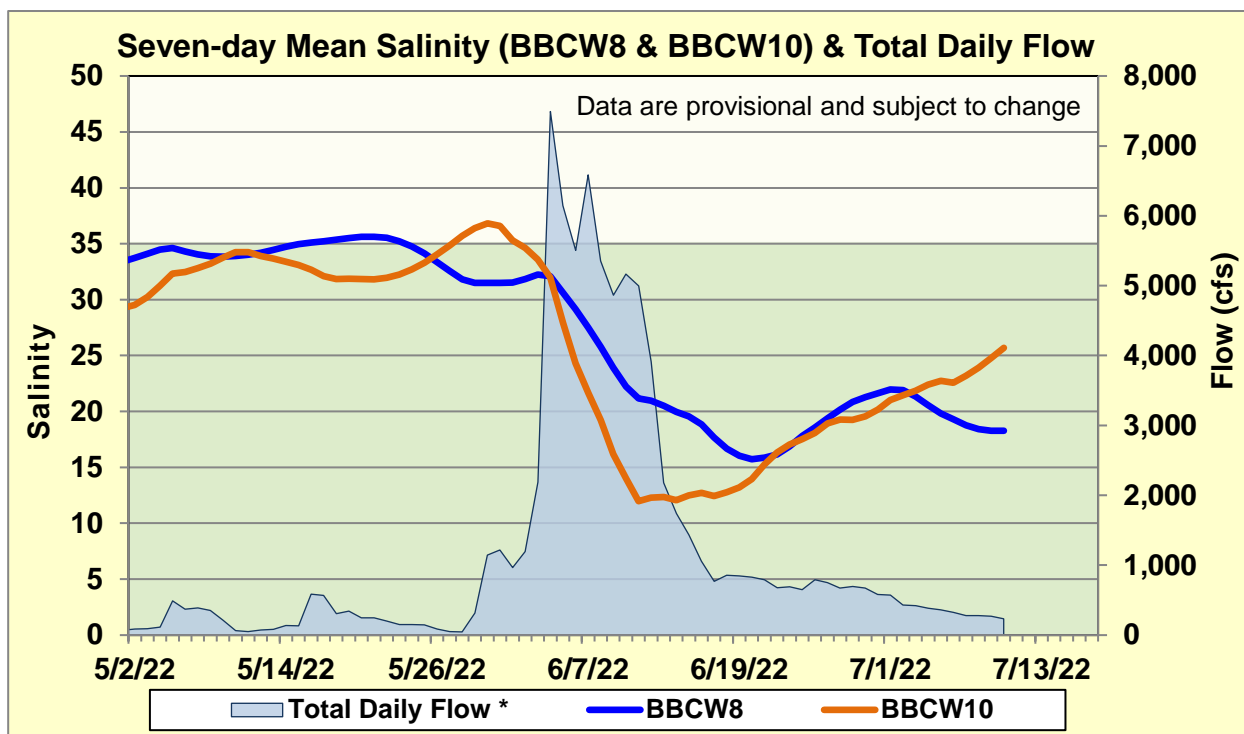
**Table EV-2.** Weekly water depth changes and water management recommendations

<b>SFWMD Everglades Ecological Recommendations, July 12th, 2022 (red is new)</b>			
<b>Area</b>	<b>Weekly change</b>	<b>Recommendation</b>	<b>Reasons</b>
<b>WCA-1</b>	Stage increased by 0.15'	Maintain or moderate current ascension rate.	Protect within basin and downstream habitat and wildlife.
<b>WCA-2A</b>	Stage decreased by 0.30'	Moderate recession rate to about 0.0 feet per week until stage at 2-17 gauge is within 0.75 feet of schedule.	Protect within basin and downstream habitat and wildlife.
<b>WCA-2B</b>	Stage decreased by 0.03'	Moderate recession rate to about .0.0 feet per week.	Protect within basin and downstream habitat and wildlife.
<b>WCA-3A NE</b>	Stage decreased by 0.17'	Return to an ascension of less than 0.18 feet per week.	Protect within basin peat soils, and downstream habitat and wildlife.
<b>WCA-3A NW</b>	Stage decreased by 0.01'	Return to an ascension of less than 0.18 feet per week.	
<b>Central WCA-3A S</b>	Stage increased by 0.03'	Maintain ascension rate of less than 0.18 feet per week, letting the water move south when conditions allow.	Protect within basin and downstream habitat, Tree islands and wildlife.
<b>Southern WCA-3A S</b>	Stage decreased by 0.11'		
<b>WCA-3B</b>	Stage remained unchanged.	Maintain rate changes of less than 0.18 feet per week in this basin, letting the water move south when conditions allow.	Protect within basin and downstream habitat and wildlife. Lower fire risk.
<b>ENP-SRS</b>	Stage increased by 0.03'	Make discharges to ENP according to COP and TTFF protocol while adaptively considering upstream and downstream ecological conditions.	Protect within basin and upstream habitat and wildlife.
<b>Taylor Slough</b>	Stage changes ranged from -0.221' to +0.051'	Move water southward as possible.	When available, provide freshwater buffer for downstream conditions.
<b>FB- Salinity</b>	Salinity changes ranged -5.2 to +2.2	Move water southward as possible	When available, provide freshwater to maintain low salinity buffer and promote water movement.



## Biscayne Bay

As shown in **Figure BB-1**, mean total inflow to Biscayne Bay was 303 cfs and the previous 30-day mean inflow was 971 cfs. The seven-day mean salinity was 18.9 at BBCW8 and 26.5 at BBCW10, both below the preferred maximum salinity of 35 for these sites. Data provided by Biscayne National Park.



**Figure BB-1.** Seven-day mean salinity at BBCW8 and BBCW10 and total daily flow in Biscayne Bay. Total daily flow was calculated using flow from structures S20G, S20F, S21, S21A, S123, and S700P.